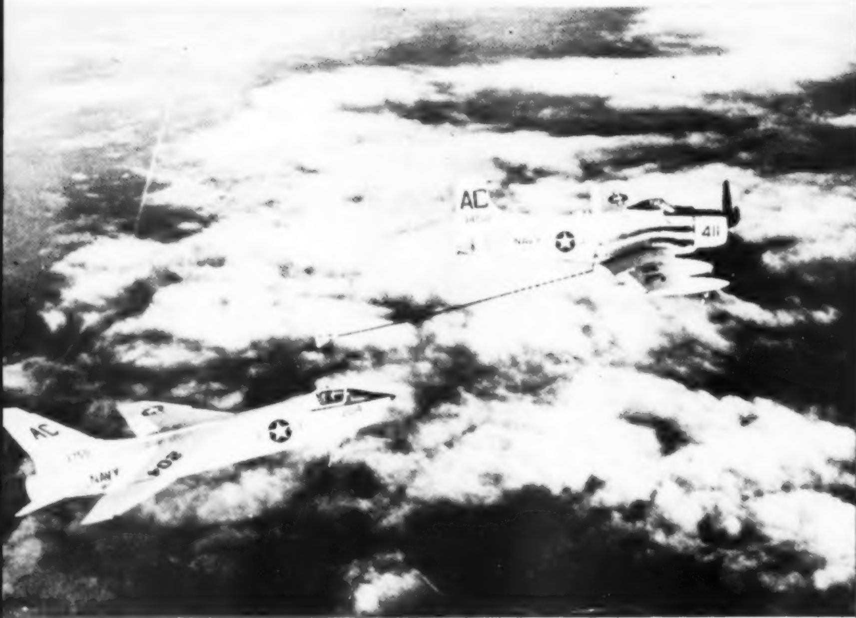
November

1959

approach

NAVAER 00-75-510

THE NAVAL AVIATION SAFETY REVIEW



IFR IN VFR?

"We're going to do some IFR tomorrow," says the skipper, "but it will be strictly VFR. If you should happen to run into IFR while doing IFR, knock off the IFR and go IFR."

What? . . . what did he say? . . . Oh sure, IFR—In-Flight Refueling. Well, there's no rule says you can't call it that, but do you want to bet that some day some aviator will get into serious trouble because he meant one kind of IFR and someone else mean the other?

APPROACH has noted a growing usage of the term IFR for In-flight refueling—and, incidentally, a continuing usage of the term "LOX" for aviators' liquid oxygen. It is worth considering that such terms might be readily understood when used among members of one group which understands their intent, but just as some of us more conservative folks don't understand the teen agers' "jive talk," there are many people who are familiar with standard, approved abbreviations only. To ATC controllers and tower controlmen, for example, IFR has only one long-standing accepted meaning.

Far be it from us to put a damper on the "jargon of the trade," but when it can create serious consequences it's time to consider whether it's in the best interests of safe flying. Even common conversation can upset a can of worms—and an airplane. Heed the plight of the flight on which the pilot noticed his copilot looking extremely unhappy—as they were rolling down the runway on takeoff the pilot gaily shouted, "Cheer up!" With that the copilot, still glum and sad-faced, calmly reached over and pulled the gear up. For more instances of such colloquial and plain language pitfalls, see "Tower of Babble," May 1958 APPROACH.

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RADM William O. Burch, Jr.
Commander, Naval Aviation Safety Center

CDR Herman Evans, Jr.
Head, Literature Department

Editor, A. B. Young, Jr.

Managing Editor, LCDR W. J. Thomas

Associate Editors:
LCDR J. M. Wondergem; LCDR D. M. Hume; LT W. B. Kennedy; J. T. LeBarron, JOC; J. C. Kiriluk; Julia Bristow

Art Director, R. B. Trotter

Illustrator, T. W. Healy, ALC

Photographer: J. E. Williams, Ph 1

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twelve issues of **approach**

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Letters

Shook Loose

Sir:

Following a twilight catapult launch in an F8U-1P I heard a loud, low pitched, grinding noise in my earset. I asked my flight leader if he had background noise on his UHF. From his negative reply and the fact that my tacan, radio altimeter, and MA-1 compass were operating erratically I surmised that I would probably lose my UHF and possibly my generator. I informed my flight leader of my aircraft condition and told him that should I lose my radio I would stay on his wing for the penetration and approach at our scheduled recovery time.

About two minutes later my radio went out along with the TACAN, radio altimeter and MA-1 compass. I extended my Marquardt unit and after checking the emergency generator operation I turned it OFF since I still had AC and DC power from my main generator. After darkness set in, the flight leader sent me the approach time, marshall bearing and distance to nearest land by Morse Code with the fuselage light.

A few minutes before approach time the leader dumped wing fuel and I followed suit, stopping the dump when he did. (We decided later that this was not a good idea as all aircraft do not dump at the same rate, especially when the location of the fuel in the aircraft is different). He signaled me that he had 4500 pounds after dumping and I had 3400. The approach time was twice delayed before we finally penetrated.

About halfway in the letdown my hydraulic warning light came ON and after checking all three systems I determined that I was losing my PC 1 fluid rather rapidly. Shortly thereafter my roll stab cut out. The leader was directed by the ship to orbit and conserve at 3000 feet. At this altitude we were in and out of the scud and I experienced a bad case of vertigo in the turn. To make matters worse, the glow on the canopy from the hydraulic warning light almost obscured the dim lights of the leader. After one orbit the leader was directed to continue the approach and we dirtied up in formation. When I sighted the deck lights of the ship I went to my own instruments to fly the straight-in approach.

In the groove I lost my yaw stab. The ship had gone to full speed when the leader told them that I'd probably be coming in fast. I hit the burble just aft of the ramp; without the stab systems I was jostled so badly I pulled the nose up and landed long. After the bolter my lights dimmed to the extent that the instruments were unreadable. I moved the emergency generator switch to LAND and regained enough light to see the gages. I got aboard on the next pass with 900 pounds remaining.

After the flight with nothing repaired except the cracked PC 1 hydraulic line, I turned the aircraft up for 20 minutes. After about 15 minutes the three circuit breakers to the power supply of the electronics package popped. The package was removed and the power supply was found to be badly charred. After replacement of this package and the fuses in the other electronic equipment, everything in the aircraft worked normally. The cracked hydraulic line was believed to be caused by vibration of the Marquardt unit.

LT C. C. SMITH, JR.
VFP-62

Don't Be Half Safe

Sir:

Last winter I participated in an extensive air and surface search for two young jet jocks who had gotten lost on a local flight and eventually ditched or ejected more than a hundred miles at sea. Sixteen years ago I was involved in a similar search for two pilots whose mission was to fly a mere 25 miles out into Lake Michigan for CarQuals. In both instances two irreplaceable pilots were presumed lost due to exposure after water immersion. In 1943 such a loss was considered tragic, but the type which had to be faced as part of the risk involved in overwater flight in winter weather. The similar occurrence in 1959 is consid-

VOLUME 5 APPROACH—THE NAVAL AVIATION SAFETY REVIEW NUMBER 5

Purposes and Policies: APPROACH is published monthly and contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders, or directives. Material extracted from Aircraft Accident Reports (OpNavs 3750-1 and 3750-10), Medical Officer's Reports (OpNav 3750-8) and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Photos: Official Navy or as credited.

Non-naval activities are requested to contact NASC prior to reprinting APPROACH material.

Correspondence: Contributions are welcome as are comments and criticisms. Views expressed in guest written articles are not necessarily those of the Naval Aviation Safety Center.

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ered an unnecessary loss due to carelessness and lack of proper supervision. The prevention of such accidents is the reason that the exposure suit was developed.

It is granted that the present exposure suit has many obvious disadvantages. *But, it will permit a pilot to survive much longer in cold water than any other type of flight clothing.* It stands to reason then, that the exposure suit should be utilized at any time there is reason to believe that it could be useful, in addition to situations where its use is mandatory. Most naval air stations are located in the vicinity of a large body of water which at times gets quite cold. At jet altitudes the winds encountered can frequently cause a track over water which is well to seaward of the desired track. Again, the duration of a planned flight over cold water is not necessarily the best criterion for determining whether to wear the "Poopy Suit." The reasonable possibility of ditching or ejecting into frigid water should be the deciding factor. Let any errors be on the safe side. Remember, the time of survival depends upon the water and air temperature *and not* the distance to the nearest land.

R. P. REGESTER, CDR

● **See "Poopy Suit Outfitting," pg. 30.**

Fire Fighting 'Copters

Sir:

There have been many comments, for and against, the use of a helicopter in fighting a fire caused by an aircraft accident. It has been the procedure at MCAAS Beaufort for the duty helicopter to follow all emergency landing aircraft down the runway until there is no chance of the aircraft going off the runway or chance of a fire starting in that aircraft. It has also been policy to get to any accident around the field as soon as possible, with a crash crewman aboard with fire fighting equipment.

Several days ago we held some fire fighting drills in our burn area to determine the practical use of a helicopter in fighting a fire. The following items were utilized:

1. One FJ-3 cockpit area
2. JP-4 fuel
3. One HRS-3 helicopter
4. Crash crew personnel.

The tests were conducted at 0900 in the morning and concluded at 1100. Several times the crash crew soaked the cockpit area of the FJ-3 with 110 gallons of JP-4 and ignited it. The duty helicopter was within one hundred yards of the fire when ignited. The helicopter re-experimented with different avenues of approach and different hovering altitudes.

It was found that the best results from use of a helicopter in this type of a fire were as follows:

1. The helicopter approach into the wind on the port side of the fire.

2. Set up a hover about 30 to 35 feet above the ground upwind from the fire.

3. The hovering helicopter must turn about 45 degrees to the right of wind line so the pilot can see to adjust his hover in front of the fire to be most effective. This is all relative to the amount of wind blowing at the time. This position is held and within a few seconds the heat and fire are driven from the cockpit area so as to permit the entrance of crash crew personnel to the cockpit without the use of foam.

4. As soon as crash trucks arrive and start to foam the area the helicopter must make it possible to set up a foam cover of the fire.

Here are several pictures taken from the duty helicopter. These pictures show the desired results when in the proper position for a hover.

The HRS helicopter was operating at approximately 7000 lbs. at the time of this drill. The wind was 8-10 knots and specific humidity was .015. I hope this information will help some of the people yet undecided as to the use of HRS helicopters as fire fighters and a good tool in their crash crew work.

PAUL W. NIESEN
Aviation Safety
MCAAS Beaufort, S. C.

● **For additional info on the subject please see page 34 Sep 1959, APPROACH.**

Photo (1) the fire about 10 seconds after it has been ignited. The helicopter is not quite in the correct position.

Photo (2) about five seconds later the air flow from the helicopter is taking effect. (Note the cockpit area.)

Photo (3) ten seconds have elapsed—crash crew personnel walk into the FJ-4, up to the cockpit simulating rescue of a pilot. No foam or fire retardant was used on this fire.

Anymech Reports

Sir:

The August issue of APPROACH contained an ANYMECH report of a maintenance error—the first signed "Anymech" in over twelve issues. Statistics published by the NASC indicate three to four hundred maintenance error accidents each year. With this many errors resulting in accidents, there must be many more errors committed but corrected in time to prevent accidents.

With HEADMOUSE I consider the airing of errors valuable in the accident prevention program, and would like to see more ANYMECH reports printed in APPROACH. I recommend that more publicity be given the program directing it toward the mechanics and technicians performing the maintenance work.

RADM FITZHUGH LEE
CNATechTra, Memphis

Marking Bomb-Bay Cooling Entry Points

Sir:

Under wartime conditions, aircraft carrying weapons internally will have to be handled with particular care during crash, rescue and salvage operations because of the nature of the weapons. In some cases, where fire attends the field or deck crash of such aircraft, measures must be taken immediately to preclude detonation of the high-explosive component of weapons through bomb-bay cooling. Failure to effect this cooling can result in the detonation of the H.E., with attendant blast, and contamination over a wide area due to dispersal of weapon material. In most cases, the maximum time available to control bomb-bay temperature is but a very few minutes.

At Leeward Point Field, we have developed a hand carried, harpoon type water spray device. This penetrates the fuselage and the spray head protrudes into the bomb-bay. The truck supplying water then backs off a short distance paying out hose as it retires. Cooling water spray is then pumped into the aircraft, while external fire is combated by regular means. While crude, this system provides the only available means to hold down weapon temperature during aircraft fires. It is fast and effective.

To ensure that coolant spray heads are placed for maximum effectiveness, it is necessary that crash crew personnel know the exact location of each weapon within the aircraft. It would be equally dangerous to enter the wrong compartment as to strike through the weapon case itself, lacking standardized entry point aircraft marking.

It is urged that locations for entry of cooling tools be decided upon and that suitable symbols be made part of standard aircraft markings. In this manner, crash crew personnel can be trained to provide maximum protection against danger of weapon detonation.

It is recommended that information regarding the entry symbol, its purpose, and training procedures be unclassified. It will enable necessary information to be disseminated at a working level.

R. M. SPARKS, CDR

● Attention is invited to U. S. Navy Aircraft Firefighting and Rescue Manual, NavAer 00-80R-14 which illustrates a bayonet nozzle of the type CDR Sparks describes, ref. Fig. 3-35. Crash, Fire and Rescue Truck, Type MB-5 is equipped with the bayonet nozzle which is mounted on the front of the vehicle. It is to be attached to the handline when it desired to pierce the skin of a burning aircraft to cool the inside with water.

The recommendation of marking entry points is being considered by BuAer.

Grow Old With Me

Sir:

By heaven, you people have done it again! The August issue of my favorite aviation magazine carried the article "Grow Old With Me." I have been stewing for several weeks in trying to write that article. For just about the same reasons, from just about the same experience and to try to say the same fatherly thing to the younger birdmen who will be doing the job that I have grown nearly too creaky to do.

"Grow Old With Me" says it perfectly. The author is the living example of the survivor of our rigorous "selection process." He makes the points as they should be made. Your article was so much better than the one I was fumbling with that I have quit. Thanks.

The only thing that I could try to add is this; I've been very lucky and have had a lot of friends. Some of my friends haven't been so lucky and I have been the one with the tragic responsibility of notifying the wife or mother of the careless or unlucky pilot. I've performed this duty six times, and believe me, it never becomes any easier.

Please, print it again in a year or so. Make the tigers read it somehow.

R. F. *(Greymouse)* HUNT, CDR

Report It

Sir:

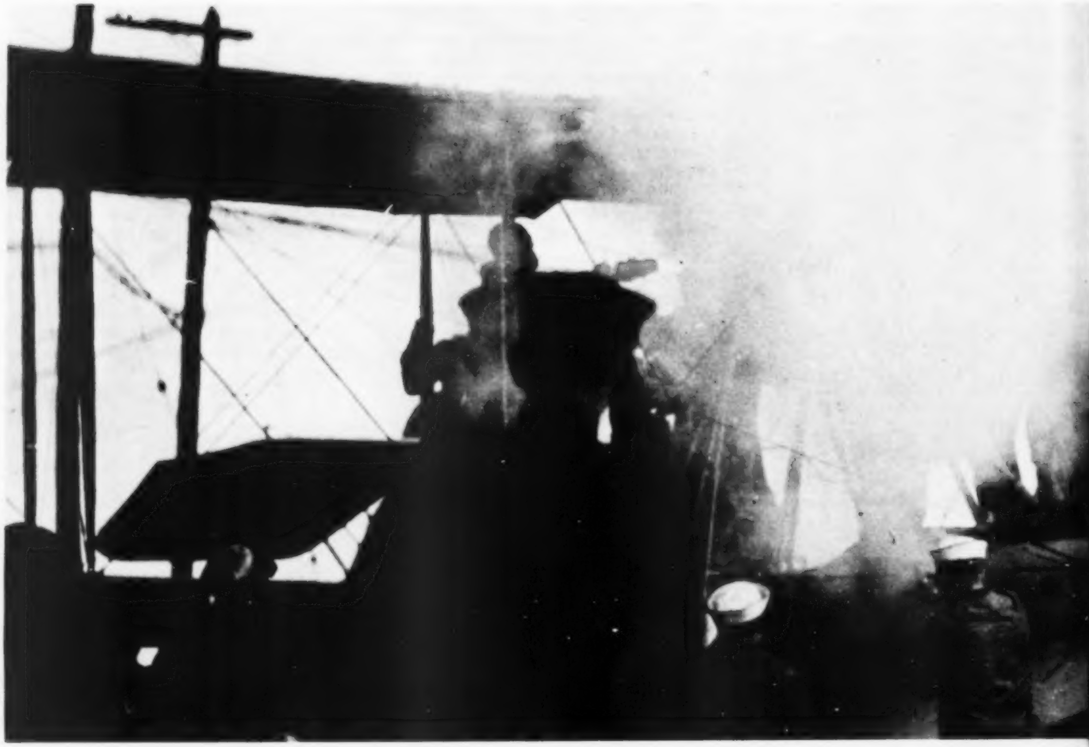
Wide publicity to types of accidents which most frequently recur is probably one of the most effective means used by the Naval Aviation Safety Center in reducing aircraft accident frequency. APPROACH and the Anymouse Report enjoy universal acceptance throughout the Navy.

Unfortunately, nearly all Anymouse Reports are submitted by pilots and are related to incidents occurring in flight. This is probably natural since most aircraft accidents occur in this manner. However, it is considered that many launching or deck accidents could have been prevented by giving the same wide publicity to the near-accidents on board ship—the ones which almost happened.

It is doubtful if there is an air officer, aircraft handling officer, catapult officer, or arresting gear officer in the fleet who is not cognizant of an incident which could have developed into a tragedy. Where accidents result, lessons are usually learned. The opportunity to learn from the near-accident, is lost if it is never brought to light and publicized.

It is therefore recommended that all operating carriers be urged to participate willingly and freely in the Anymouse reporting system. While it is recognized that the results of these reports are not measurable, it is not inconceivable that one report can save one life and one aircraft.

R. C. CORLETT
CO NATechTra, Philadelphia



INFORMATION PLEASE!

The FUR system is the backbone of our Material Reliability Program. You can help its achin' back.

Every once in a while we read something about the "good old days" of flying which sounds wonderful and sometimes humorous. In any field of endeavor we start with curiosity and honest ignorance and struggle forward from there. With this in mind read the following excerpts from the RFC (forerunner of the RAF) monthly report and judge for yourself just how much some of us have progressed.

"Another good month. In all a total of 35 accidents were reported, only 6 of which were avoidable. These represent a great improvement over November, when 84 accidents, 23 avoidable, occurred.

"There were 29 unavoidable accidents:

"The top wing of a Camel fell off due to fatigue failure of the flying wires.

"Sixteen B.E.s and 9 Shorthorns had complete engine failures. A marked improvement over November's figure.

"Accidents during the last three months of 1917 cost 317.10.6 pounds (about $1600)—money down the drain and sufficient to buy new gaiters and spurs for each and every pilot and observer in the service."

Reliability Conference Set

The Third annual Navy-Industry Conference on aeronautical reliability will be held at the Hotel Cavalier, Virginia Beach, Virginia, on November 4-5.

The theme of this Third Navy-Industry Conference is "Reliability—A Key to Readiness." The conference is designed to stimulate appreciation of the technical problems involved in (1) aircraft material reliability, maintainability, and safety requirements for maximum operational integrity; (2) methods of analysis, test, demonstrations, and maintenance procedures; and (3) feed-back and dissemination of technical information from field activities, operating forces and industry and to obtain the cooperation of all interested parties in formulating solutions.

The program is sponsored by the Chief of the Bureau of Aeronautics and under the auspices of the Commander of the U. S. Naval Aviation Safety Center.

THE second annual Navy-Aircraft Industry Conference on aeronautical material reliability held about this time last year focused attention on the need for improved coordination between the operators and producers of aeronautical material to ensure improved reliability.

It was pointed out that since World War II the advances in weapons technology have progressed at an unprecedented rate.

The entire art of warfare is undergoing basic changes. Fewer highly skilled men are operating machines of tremendously increased effectiveness and associated complexity. Before any new weapons system achieves an operational rating, it must first be invented, designed, developed, evaluated, and then frequently modified in a trial and error process.

The cost of this process in terms of money, time, and technical manpower is rapidly approaching the limits of our national capacity.

Even more serious is the adverse effect on national security when weapons of inferior reliability are introduced into operating fleets.

To cope with these problems the Bureau of Aeronautics assigned the Naval Air Technical Services

Facility (NATSF) the task of coordinating its Material Reliability Program (MRP). The objectives of the program involve:

- Providing comprehensive and coordinated systems of data collection, analysis and dissemination by which operational experience can be transmitted rapidly between operators and designers of aircraft and weapons systems, and
- Fostering the development of methods for projecting past experience into refinements in design of current equipment and into the design and development of new aircraft and weapons systems.

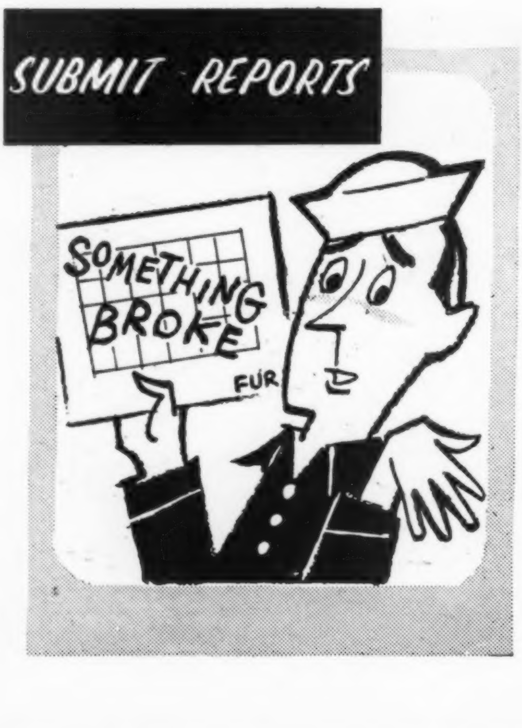
Guiding the program is the Navy's newly created standing BuAer-Industry Advisory Board on Reliability and Operational Design Requirements of Aeronautical Material. Rear Admiral L. D. Coates, Assistant Chief for Research and Development, is Chairman of the Board. The Board is comprised of ten members drawn from industry and five from BuAer. (See listing this page.) The areas in which the board is most active are:

(1) reliability, maintainability, and safety requirements for maximum operational integrity;
(2) methods of analysis, test, demonstrations, and maintenance procedures;
(3) feedback and dissemination of technical information from field activities, operating forces and industry.

Membership of BuAer-Industry Material Reliability Advisory Board (BIMRAB)

F. E. Rogozienski, Capt., USN, Vice Chairman	BuAer
Mr. C. L. Cahill	Aircraft Radio Corp.
Mr. J. de S. Coutinho	Grumman Aircraft Eng. Corp.
Mr. G. C. Covington	McDonnell Aircraft Corp.
Mr. G. R. Gehrkens	North American Aviation, Inc.
Mr. W. L. Gorton	Pratt & Whitney Division
Mr. T. J. McLaughlin	Loral Electronics Corp.
Mr. F. H. Robbins	Westinghouse Elec. Corp. Aviation Gas Turbine Div.
Mr. C. M. Ryerson	Radio Corporation of Amer.
Mr. O. J. Schaefer	The Martin Company
Mr. W. L. Whittier	Douglas Aircraft Co., Inc.
T. M. Adams, Capt., USN	BuAer
A. E. Allemand, Capt., USN	BuAer
H. R. Badger, Capt., USN	BuAer
Mr. F. M. Gloekler	BuAer
E. A. Lohman, Capt., USN	BuAer

The board is primarily an organization of engineers from industry who have a professional interest in the Navy's problems and personally wish to assist the Navy in arriving at an optimum solution. They receive no government remuneration.



To provide rapid collection and evaluation of information on unsatisfactory material, failures, and inadequacies of aircraft maintenance, BuAer developed the Failure, Unsatisfactory, Removal Report (FUR) and the Disassembly and Inspection Report (DIR). Activities maintaining aircraft are required to submit a FUR report whenever a material failure, design deficiency or malfunction of an aircraft part is discovered. Reports of these types are forwarded daily to NATSF where this information is transferred into punched-card records for rapid processing and dissemination to Navy and Industry organizations.

Major problems discovered by NATSF are highlighted in the "Reliability Digest," a newsletter published by this Facility to provide feedback information to reporting activities. Units not receiving sufficient copies should contact NATSF, 700 Robbins Ave., Philadelphia, Pa.

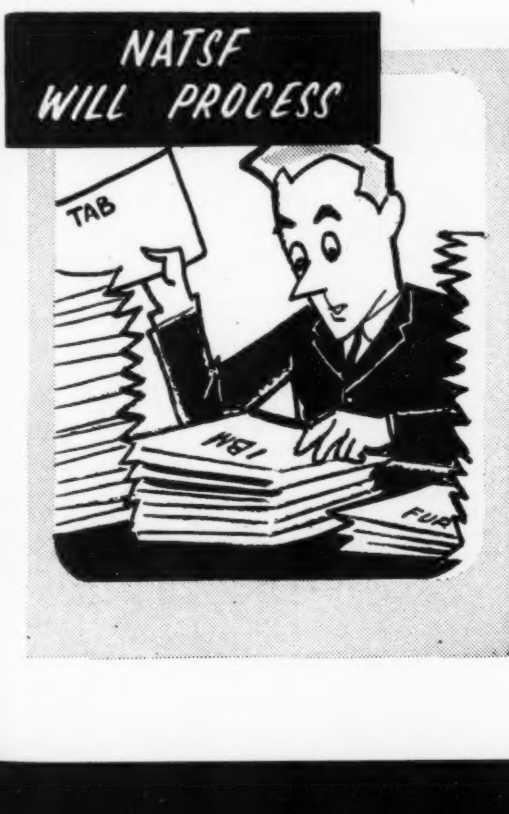
Trouble reports and accident information provides the basis for action initiated with airframe and component manufacturers for improvement, or redesign.

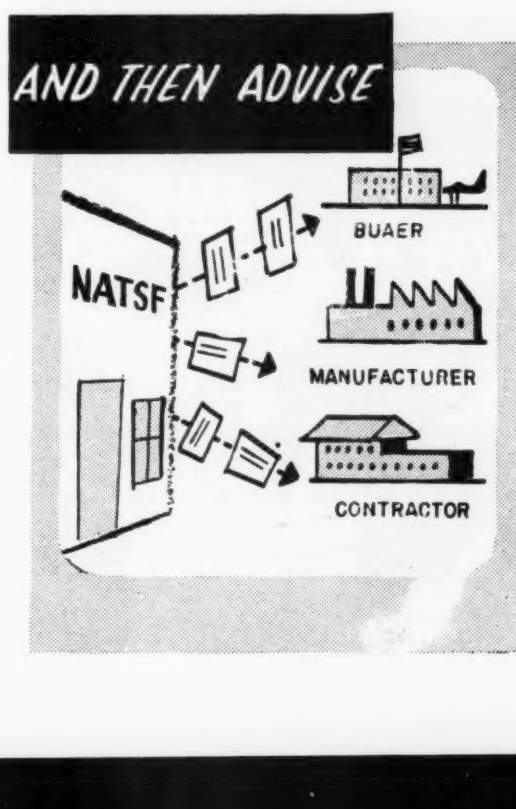
Safety-of-flight deficiencies are reported by message so that immediate corrective action can be taken and all operating activities may be alerted to potential hazards. A follow-up FUR report is also required. The Naval Aviation Safety Center monitors all safety-of-flight messages for correlation with material factors which may have been involved previously in aircraft accidents.

The FUR is the backbone of the Material Reliability Program. The form is tied in with the standard Supply requisition form and no accountable part which breaks, wears out, or malfunctions can be replaced without first be written up. Thus, FURs become records which can be used to alert Supply of special problems for necessary spares provisioning. Engineering analysis of these records provide guidelines for implementing fixes for those components which wear out more rapidly than planned, or through faulty design, as well as playing a major role in the modernization and modification of our in-service aircraft.

Offhand it appears the FUR system is the answer to our problem. This is how the system is supposed to work.

Let's assume, for example, that a trouble-shooting mech at NAS Naveroo blows the whistle with a FUR report when he discovers a faulty jet fuel control. About the same time a mech in ComNavAirPac and still another aboard a Med carrier reports pretty much the same trouble. Supply people are automatically cut in— a quick check for this part number tells them how many valves are in the system, where, and the usage rate clues them in on how many will be needed to keep the pipeline filled. Reliability Engineers of the manufacturers,





NATSF and BuAer peg the trouble with the valves and come up with an Engineering Change Proposal which will fix the valves so they will do properly what they're supposed to do. Presto! We're in business again. Simple, isn't it?

But, ever since the beginning of the system (mid-54) the processors of the information have been plagued with incomplete, inaccurate, and sometimes the lack of reports.

This, according to NATSF, has hampered the effectiveness of MRP. They say, "these forms are designed to furnish service experience from the users of aeronautical material. The mechanical processing of data provides the necessary management information for an effective reliability program. However, the processing of the reports reveals errors due to inaccurate, improper and incomplete preparation. Most common errors are the omission of identification data, and excessive use of the AMPFUR designation without supporting information."

AMPFURs are being received less certain portions of valuable information necessary for proper action. Propeller blades, for instance, are reported *without serial number;* engine and propeller overspeeds *without noting the maximum RPM;* engines with excessive oil consumption *with no quantities noted;* engines being removed for overhaul due to lack of oil pressure when only the oil pump was malfunctioning but *with no reference being made to the failed part.*

Lack of Reports—Often trouble develops in which parts replacement are not involved, or, the difficulty is corrected by the replacement of non-accountable parts. The trouble is corrected locally but is being experienced Navy-wide.

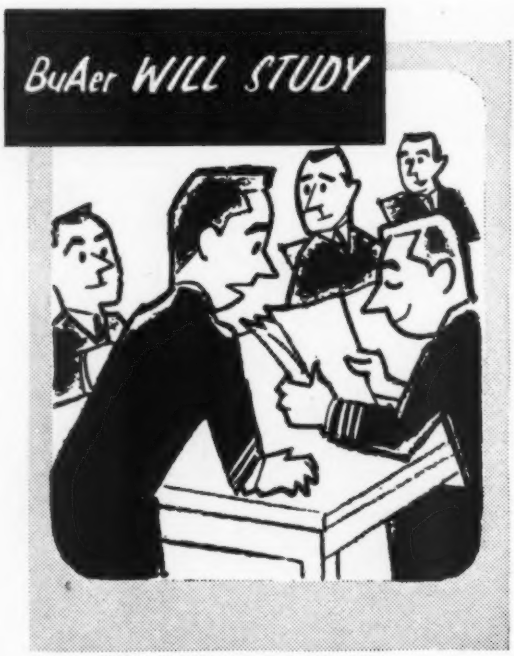
For example, leaks which develop in hydraulic lines and fittings. These are squawked on the yellow sheet, the mech replaces a seal or takes a few turns with a wrench and signs off the complaint.

Another trouble of this type is the replacement of light bulbs. Bulbs are drawn from non-accountable stock and the complaint is signed off.

Still another instance is the severe crazing of acrylic housings for A4D-2 wingtip lights—advance warning of impending failures. No FURs were made of these.

Belatedly, the Navy has become aware that the reliability of external light systems in several new jet aircraft is wholly unsatisfactory. In the case of the A4D, replacement stocks of acrylic housings with which to replace crazed housings were insufficient. Advance notice of this condition as soon as it was observed could have averted this shortage.

The flow of information to NATSF is becoming increasingly effective but many troubles go unreported because accountable parts are not in-



volved. Reporting of these problems is dependent entirely upon the initiative of the man on the line to fill out a FUR when he observes or fixes a problem. The FUR system has a tremendous potential for correcting not only situations such as these but all types of aeronautical equipment.

One of the important factors in the study and analysis is the actual time that a discrepant item has been in operation since new or overhaul. Reported time in service should be taken from log books or accessory card. When this information is not available a reasonably accurate estimate of time in service should be given in space 16 of the FUR.

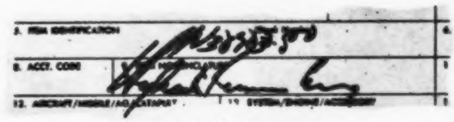
The result of submitting incomplete reports delays engineering analysis and in some instances, renders the report useless until the missing information can be obtained. The reporting of erroneous stock or part numbers causes extra expense and misuse of engineering effort.

Much time can be saved if the identification, part number and manufacturer is taken from the nameplate of the deficient part or from the Illustrated Parts Breakdown Manual (IPB).

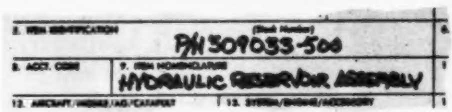
The identification plates on aircraft parts such as wings, ailerons, rudders, flaps, seats . . . , can cause confusion if the part number stamped on the plate is used by maintenance personnel while attempting to identify a specific installation. The reason for this is that the part number on the plate denotes the major structural assembly of the complete installation, *not the installation.*

Numerous reports are being classified confidential. *The classification of FUR and EFR reports is seldom necessary.* As a general rule classified

HOW CARELESS HANDWRITING LEADS TO TROUBLE



WHAT WAS WRITTEN



WHAT WAS MEANT

WHAT HAPPENED: CAUSED CONFUSION, EXTRA EXPENSE AND MISUSE OF ENGINEERING EFFORT. OFTEN REPORTS TURN OUT TO BE WORTHLESS.

reports are required only when classified operational characteristics are noted. Over-classification causes delays and difficulties in processing and distributing reports.

In defining the reason for removal, terms such as "Inoperative" will not do.

If, for example, a generator is not working, spell out the reason. If the generator brushes are burned out, say so. If it's because of a short, broken lead or broken field wire, say so—be specific. A "No remarks" entry doesn't help the analyst a bit.—Give out with the information, please.—Reliability engineers cannot make analyses and start improved material on the way to you unless they have accurate information to work with.

FURs in most cases are being prepared on a typewriter. While this method of preparation is very effective, use of a worn typewriter ribbon results in reports that are not readable when reproduced on microfilm. FURs are being delayed because reporting activities are taking time to have the reports typed. FURs may be prepared on a typewriter or printed legibly with a ball point pen. Utilize the method that will expedite the forwarding of FURs; *but be sure the printing is legible.* The handwriting example on this page explains why.

Completed reports should be reviewed prior to mailing. This should be done by qualified persons to insure adequate reports. However, FUR reports should not be delayed. An example is the method employed by the Safety Officer of CNABatra, Pensacola. A FUR "postoffice" was set up equipped with desk, writing materials, EFR and FUR Check-off Charts for guides. A qualified man rechecks nomenclature, stock and part numbers, description of failure, etc., and promptly mails the Report. Of course a "post office" may not be practicable for a deploying squadron but a portable system should be quite effective. As a matter of mutual interest APPROACH invites readers to tell us how you do it.

For the Material Reliability Program to work efficiently, rapid communications are essential. MRP reports (FURs AMPFURs and EFRs) must be mailed daily. The segregating of these reports before mailing will expedite handling and processing by NATSF. Continental activities east of the Mississippi River can forward these reports by regular mail. All others should use Air Mail.

Routine FURs are processed within a matter of two to three days after receipt. Safety-of-flight and Urgent AMPFURs are processed the same day they are received and are sent to both BuAer and NASC for action and dissemination. One of the major gaps in these communications has been that reporting units are taking as much as 10 days to submit an Urgent report and up to 20 days for routine FURs.

The establishment of a priority for Flight Safety and Urgent AMPFURs is dependent upon the circumstances surrounding the removal or unsatisfactory condition. When the priority is determined be sure to fill in the applicable block in space 27 of the FUR. A priority report must be carefully prepared and should include:

- Concise statement of trouble.
- Description of the circumstances relating to the unsatisfactory condition so that receivers can understand them.
- Recommendations by the reporting activity to correct deficiencies or to preclude recurrence of the problem.

Remember, if photos are necessary it is important that these be mailed together with the report. Be sure that the activity name and FUR serial number is marked on the reverse side.

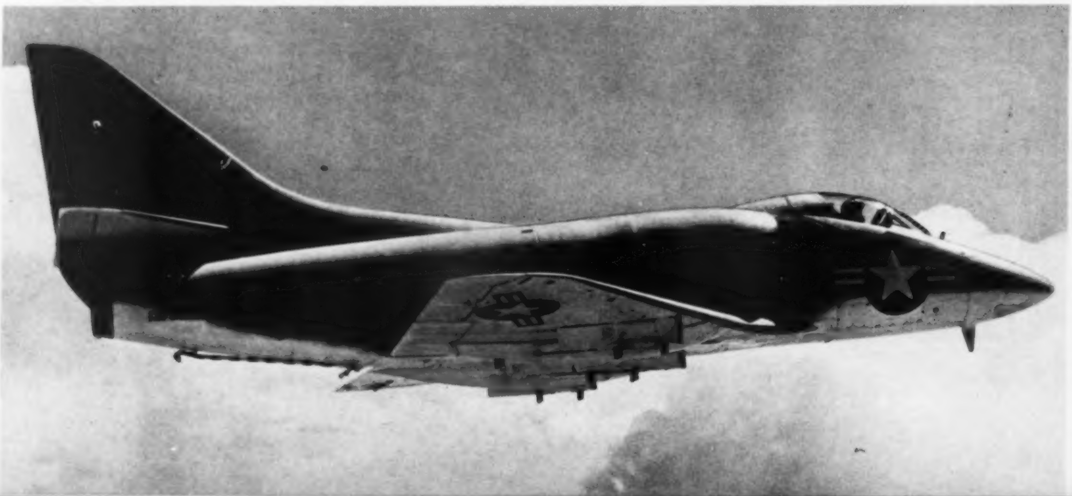
Basically, MRP is a streamlined reporting program. As with any system or plan to collect and analyze service experience and provide data to permit expending engineering effort where needed most, the examination of large masses of data is of first importance. The MRP provides the medium for a composite look at aircraft and equipment performance under service conditions. The maximum results can be obtained only when the users are conscientious about reporting all deficiencies.

The processing deficiencies reported in the foregoing indicate the importance of submitting complete and accurate information promptly. Each report must contain good data to preclude delays in verification. Only that data which can be verified is processed. Reporting activities are urged to check and verify all items concerned with part identification prior to submitting MRP reports.

To help overcome the deficiencies of MRP reporting BuAer has recently prepared a training film titled "Aeronautical Material Failure Reporting," FN 8847, for distribution through your nearest training aids library.

If you want more reliable machines to fly, service, maintain and overhaul, both today and tomorrow, step up the reliability of your MRP reporting.

Our future progress, our very security depends on our ability to streamline our weapons development procedures while at the same time insuring overall reliability.



Normally only one moderate impact will be felt if you don't forget

REVERSE ENGLISH

GOOD open sea work is a definite challenge to a seaplane pilot's skill and gives a real feeling of satisfaction when done properly. Open sea work demands a sound knowledge of the motion of the sea, the flying qualities of the seaplane, and certain principles of physics as applicable to seaplane landings. While emergencies are rare, all boat drivers should understand the rules.

Recently we participated in a project which required some 30 open sea landings and takeoffs. This open sea work was done in sea states from 0 to low 4 (6- to 8-foot waves) in the Key West area. Frankly, these tests were approached with some trepidation, but with experience, quite a rivalry developed among the pilots involved to amass the most open sea landings and takeoffs.

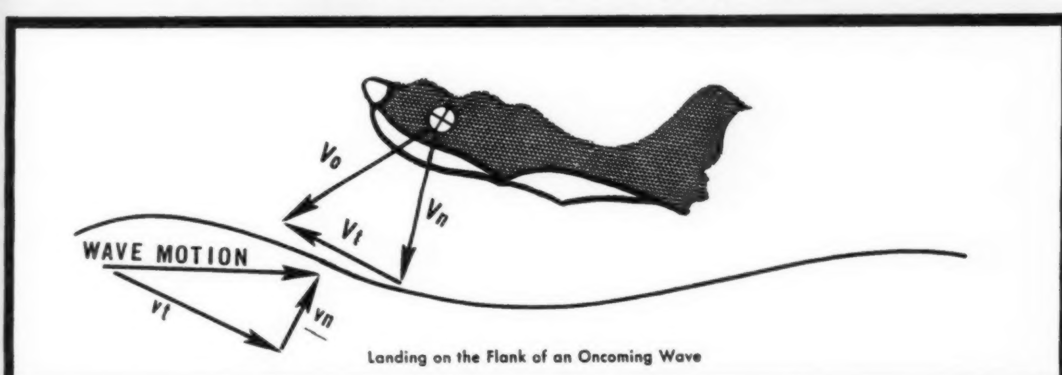
In order to pass along the experience we acquired, this discussion of the basic principles of open sea landings and the techniques we prefer is offered for consideration.

The Landing Forces in Waves

The diagram is intended to depict impact forces only and does not represent recommended landing direction relative to swells. Consider the vector diagram in which the flight path of the aircraft is shown as the vector *Vo*, which may be resolved into components *Vn*, normal to the water surface and *Vt*, tangential to the surface. To the velocity of the aircraft must be added the normal and tangential wave velocities *vn* and *vt*. The penetrating velocity is then the sum *Vn* + *vn* while the water speed which generates planing lift on the hull and horizontal impacts is *Vt* + *vt*.

All of these component velocities must be minimized to reduce landing impact. Both *vn* and *vt* are kept small and may be made even negative by selection of the proper landing heading and point.

by Lcdr. Richard A. Hoffman and Cdr. Richardson Phelps, Jr.



Landing on the Flank of an Oncoming Wave

Vt and *Vn* are minimized by flying a flat, slow, power approach. Since the impact force varies as the square of the speed, a 10 percent reduction in velocity will reduce impact loads by approximately 19 percent.

The Sea Evaluation

An excellent discussion of the effect of the sea surface as applicable to open sea seaplane operations is given in OpNavInst 3730.4 "Aircraft Emergency Procedure Over Water," which we recommend very highly. Of particular importance is the discussion on the selection of a ditching heading and sea evaluation. Sea evaluation should be constantly practiced by seaplane pilots.

Once the primary and secondary swell systems are recognized using the techniques of OpNavInst 3730.4, one final analysis is made. This is what we called "eye integration" and is simply flying various headings in the general direction of the first selected landing heading at an altitude of about 50 feet or less. When the apparent least rough heading has been determined, it should be noted and final preparations made for landing.

Normally, we ignored the wind and landed parallel to the main swell with the secondary swell broad on the bow or on the quarter.

P5M Landing Techniques

All landings made in the tests were done at 62,000 pounds with all equipment functioning. Normal c. g. limits were maintained and the airframe was a standard P5M-2. All crew members were equipped with H-4 crash helmets and manned ditching stations during all open sea landings and takeoffs.

After a complete evaluation of the sea and selection of the landing heading as discussed above, ditching stations were manned, RPM advanced to 2600, flaps lowered to 40 degrees, and a letdown at 100 knots was made to landing heading. At 100 feet RPM was advanced to full increase, the prop reverse control placed in taxi position and all friction taken off the throttle quadrant. At this point, power and nose position were adjusted to slow the aircraft to reach an IAS of about 85 knots (add approximately ¾ knot per 1000 pounds additional gross weight) at 30 feet altitude. This airspeed is about *8 knots below power-off stalling speed* but 6 or 7 knots above the power on stall speed. At 10 to 15 feet, (an accurate radar altimeter is a big help here) continue adding power and rotating the nose up until the aircraft is maintaining altitude at about 80-82 knots IAS. As much as 30-35 inches of manifold pressure may be required.

Now the aircraft may be slowed to about 78 knots and held at this airspeed until the tail begins to "tick" or the pilot is absolutely sure he is at the proper altitude and spot for landing. Needless to say, the stall warning is shaking during this phase of the landing approach. At "the spot" the throttles are closed briskly and slipped into the reverse range. The pilot returns his right hand to the yoke and the copilot applies 40" of reverse manifold pressure.

The pilot's hand returns to the yoke because we found a strong nose-up pitching moment on initial

LCDR Richard A. Hoffman was graduated from the Naval Academy in 1947, and served two years on the destroyer DENNIS J. BUCKLEY before entering flight training. Finishing PBM advanced training in late 1950 he served in VR-2 which was then flying the JRM seaplane transport. In early 1952 he transferred to VP-892 (later VP-50) where he flew PBMs on the Formosan Straits Patrol and the Korean Patrol. He attended the Naval Postgraduate School from 1954-57, receiving a BS in Aeronautical Engineering from Monterey and an MS in Seaplane Hydrodynamics from the Stevens Institute of Technology. He was a project officer in VX-1 flying P5M-2 and S2F aircraft until recently transferred to CinCLant Fleet Staff.

CDR Richardson Phelps, Jr. is a graduate of the U. S. Naval Academy and the U. S. Naval Postgraduate School. His past service includes duty aboard USS SIMPSON and USS S. N. MOORE, and in VP-62, VP-44 and VX-1. He has flown the PBY, PBM, JRF, P5M-1 and P5M-2. CDR Phelps recently left VX-1 as evaluation officer for duty in OpNav.

impact. The pilot must maintain a nose-level attitude by rapid and positive use of the yoke. We found application of full down elevator immediately after impact, followed by neutralization of the yoke produced the best results. Extreme care must be used, however, to avoid digging the nose. We do not advocate the blind application of full down elevator by an inexperienced open sea pilot but we do wish to point out that positive control movements are necessary to prevent being thrown out of the water with subsequent violent impacts. This technique is essentially the "jockeying nose" method described in NASA-A64-P1-953 of August 1953.

If the nose position is controlled and the copilot expeditiously applies reverse power, normally only one moderate impact will be felt. The aircraft decelerates very rapidly and smoothly.

The project pilots feel a safe landing may be made using this technique in sea states up to 5. Above sea state 5 use of this technique should minimize the danger of structural damage to the aircraft. We do not recommend reversing in the air as advocated in "Short Stop" (January 1956 APPROACH) because of the difficulty in judging altitude and the danger of falling into a trough, which was done on one landing, breaking the APU from its mounts.

Open Sea Takeoffs

Although open sea takeoffs are not recommended operating procedure, they may be made in sea states up to 3 by experienced pilots at gross weights of 65,000 pounds or less. We found the following general technique produced the safest takeoffs.

All preparations for takeoff are made (JATO hung, circuits tested, crew at ditching stations) before final selection of the takeoff heading. When all is ready, taxi the aircraft into a number of the obviously possible takeoff headings at about 20-25 knots. When the possible headings are narrowed to one or two, drop flaps 30 degrees, add power slowly to takeoff power and begin a simulated takeoff run, letting the speed build up to about 40 knots or where the aircraft is just planing. Some slamming and bucking will occur but at these speeds little danger of damage is present. The simulated takeoff runs will enable the pilot to decide on the optimum heading and will acquaint him with the motions to be encountered during the actual takeoff.

When the takeoff heading has been selected, arm all JATO and accelerate slowly to about 30 knots (just below planing speed). If everything is under control, add takeoff power smartly and turn over the throttles to the copilot. Do not lock friction so that the throttles may be cut rapidly

in case of an abort.

During the takeoff run, extreme care must be used to keep the wings level and the nose fairly level (relative to the water surface). The yoke may have to be horsed about rather violently to avoid slamming into oncoming swells. At about 50 knots, if everything is under control, all four JATO bottles are fired. JATO should be fired as late as possible to obtain maximum acceleration and safety at the higher end of the takeoff speed range.

On most takeoffs, we found a tendency for the aircraft to be thrown out of the water at about 50 knots. We found that if we were thrown out at 50 knots or above, by leveling the nose and firing the JATO while airborne, we were able to accelerate to flying speed before hitting the next swell. This technique, however, is a matter of preference; perhaps a safer general rule if thrown out is to attempt to hit the next swell in as flat an attitude as possible, then level the nose and fire all JATO. With full power at 62,000 pounds the aircraft should fly at about 70 knots. On most of the runs, 40-degree flaps were dropped at 45 or 50 knots.

Emergency Techniques

No single-engine or simulated night landings were attempted during these tests. However, there was much discussion of possible open sea emergency techniques, and we feel the following procedure should result in the safest landings.

For all emergencies, lighten ship as much as possible. On day single-engine, after sea evaluation, recommended procedure is to be ready for landing at 50 feet and 95 knots, or the lowest speed above 95 knots at which it is possible to maintain altitude. Continue the letdown very slowly until at about 20 feet. At this point adjust power and nose position to an airspeed as low as safely possible until the tail "ticks." Reduce power but do not cut and concentrate on holding a level or slightly nose-high attitude relative to the water surface while the aircraft decelerates. When it appears the aircraft will not be thrown out, drop the power and complete the runout by using hydroflaps and reverse. If the aircraft is thrown out, use power to cushion subsequent impacts.

Night single-engine should follow much the same procedure adding perhaps a few knots and feet of altitude for safety. Sea evaluation will have to be done from observations made during daylight or from the navigator's best winds. Unless the visibility is exceptional, recommended procedure is to fly the aircraft into the water with as low a forward speed and rate of descent as possible. Leave some power on immediately after touchdown in order to have power available to cushion bounces.

The project pilots feel that the P5M has excellent open sea characteristics for an aircraft not designed to operate from the open sea. By proper application of the principle that all relative velocities must be kept at a minimum, safe landings may be made in almost any sea state.

Recommendations

We feel that most qualified copilots possess the experience to make successful open sea landings provided that those pilots can select the proper landing heading. Therefore we recommend that aircraft and squadron training include sea evaluation and simulated open sea landings.

These flights should include recognition of the primary and secondary swell systems, "eye integration," selection of a landing heading and a simulated landing, waving off just before touchdown. A few flights of this nature will raise the pilot's sea evaluation experience level and enable him to cope successfully with the problem of landing in the open sea.

WELL DONE

Lt.(jg) Bodensteiner of VP-40 had been airborne for about 20 minutes on an operational flight from Sangley Point, P. I. At an altitude of 1500 feet, weighing 76,000 pounds the P5M-2's starboard engine lost power instantaneously and completely. Unable to jettison the full bomb-bay tanks (7000 pounds) because of a malfunction in the emergency stores release system and with full military rated power on the good engine, the great bird settled toward the water at 900 feet per minute. Faced with an immediate open sea landing 6000 pounds over maximum recommended landing weight and on one engine, Lt.(jg) Bodensteiner and his crew reacted automatically as a team.

The ordnanceman was able to close the bomb-bay doors with the hand pump which lessened the drag. Just prior to touchdown, Lt.(jg) Bodensteiner dropped 40 degrees (full) flaps and effected an open sea landing parallel to a running six-foot swell with no injury to personnel or damage to the the aircraft. After landing, the pilot taxied 30 miles into Cubi Point, P. I. where the aircraft was ramped. Well done to Lt.(jg) Bodensteiner and his crew.

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NIGHT TAKEOFF TROUBLE

It is patent that the crew of the transport were highly experienced (—and that the aircraft was operating normally—). It is also evident that both pilots thought the airplane was climbing out normally and neither realized it was, in fact, descending. With this in mind, the Board has studied the phenomenon of pilot sensory illusion to determine whether such is applicable to this accident. Considerable material on this subject is available from military and civilian aeromedical research organizations.

All of these organizations recognize the existence of misleading physical sensations experienced by pilots under conditions of reduced sensory stimuli. One authority* concludes that, "the forward acceleration of the aircraft after takeoff causes a sensation of nose-up tilt because the pilot cannot distinguish between the direction of gravity and the result of gravity and aircraft acceleration. If the pilot is not fully on instruments, this can cause him to lower the nose, and the acceleration in the resulting dive perpetuates the illusion. The aircraft can enter a shallow dive, with or without turning, and the pilot will still experience a sensation of steady climb." The paper goes on to say, "If it is also very dark and the direction of takeoff is away from a built-up lighted area, there is nothing to be seen which can give a horizon reference and the pilot is now very likely to get this false impression of the attitude of the aircraft in pitch. Because it is too dark to see the ground, loss of height is not apparent."

The Board believes that the conditions which existed at the time N [redacted] took off were ideal for the propagation of this illusory effect. Visibility was reduced by fog and takeoff was made from a built-up area toward a very dark unlighted space where the pilot had no reference to a horizon by which to determine the attitude of the aircraft. It is important here to recognize that sensory illusions will not necessarily cause a pilot to dive the aircraft but can completely conceal the fact that a descent has commenced.**

From evidence adduced during the investigation it was shown that the aircraft took off normally, climbing to a height of about 100 feet. The aircraft should be roughly at this altitude as the flaps retract through the 10-8 degree position. This portion of travel of the flaps will produce the greatest change in attitude of the aircraft. At this point the aircraft nosed over and began its descent. Obviously, the pilots were unaware of this change of attitude and therefore did not initiate any corrective action. It is equally clear that the absence of stimulation to the visual sense was instrumental in effectively concealing this change of attitude. Finally, the continued acceleration of the airplane in its descent sustained the illusion, giving the pilots the impression of a steady climb.

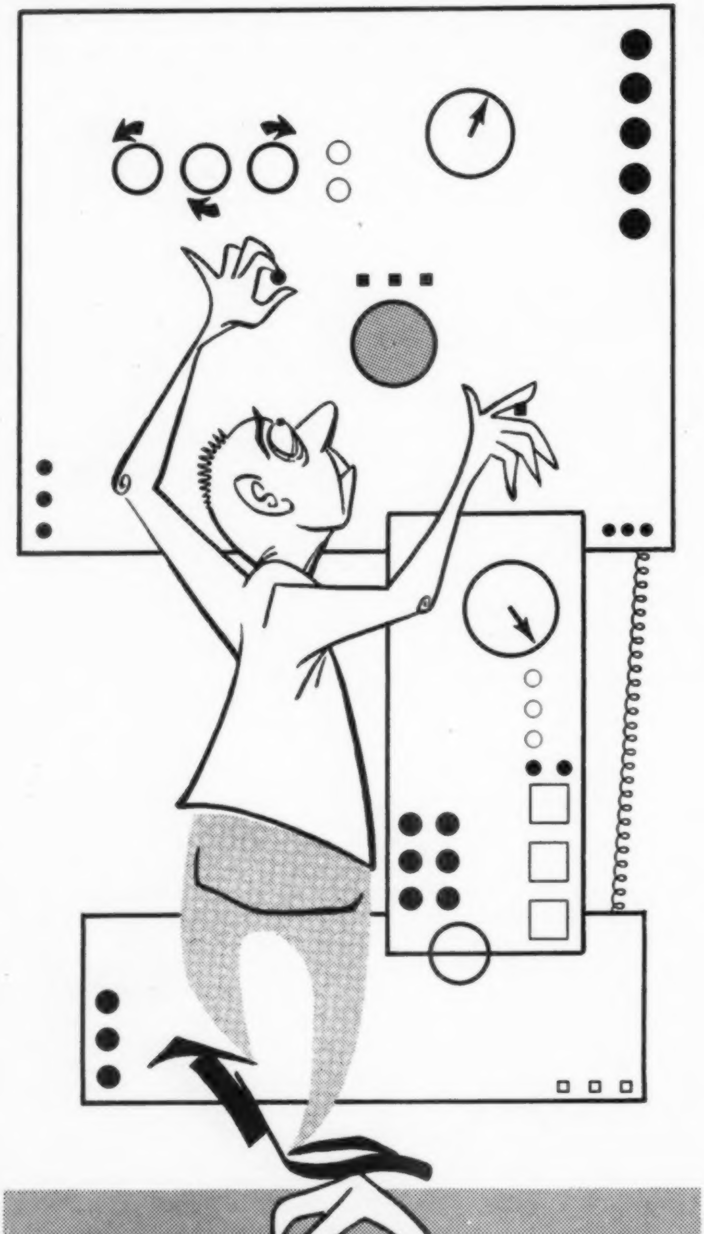
A pilot with the experience of Captain [redacted] must be familiar with night takeoffs in conditions of reduced visibility and therefore should have realized that full utilization of all the aircraft instruments was mandatory. The rate-of-climb instrument is not a primary instrument during initial lift-off, because of ground effect and the inherent lag in its indications. However, as mentioned before, it would require approximately 15 to 20 seconds for N [redacted] to reach a height of 100 feet from liftoff. At this time the rate-of-climb instrument would be indicating correctly. Moreover, the artificial horizon, the airspeed indicator and altimeter are instruments which will give positive and immediate indications of attitude. To monitor one instrument to the exclusion of all others indicates a lack of the normal alertness and attention demanded of a pilot.

In addition, all normal procedures require that a positive climb be established before flaps are retracted. In order to maintain this climb, some positive control action must accompany the flap retraction. Again it is elementary that where visual reference to the ground is precluded the use of flight instruments is necessary in order to ensure proper control of the aircraft.

One further indication, which should have been apparent to the pilot through normal alertness, was the extremely rapid acceleration of the aircraft. As stated before, under normal operating procedures it would require approximately 85 seconds for the aircraft to attain a speed of 155 knots and it would have traveled a horizontal distance of 15,000 feet. Here the aircraft speed was 155 knots when it first hit the ground about 7,600 feet horizontally from start to takeoff. According to the Captain's testimony he thought he was still over the runway as he had not seen the threshold lights. To have attained a speed of 155 knots in this distance also should have alerted him that the acceleration was far greater than normal."—*From a recent CAB Report*

* Dr. John C. Lane, Superintendent of Aviation Medicine, Department of Civil Aviation, Australia. Reprint circulated by Flight Safety Foundation.

** On an aspect of the accident, history of aircraft taking off at night, A. R. Collar, ARC Tech. report R&M No. 2277 (9872).



ENGINEERING WITH A DIFFERENCE

ONE of the probably spurious stories told about Abraham Lincoln concerns his answer to a question as to how long his legs were. The gag has him replying, "Long enough to reach the ground." His answer would have sent one type of engineer we have with us today into a complete frenzy. This new breed is the Human Engineer. He doesn't engineer humans, but rather engineers things that humans use to fit humans.

The caveman whose buddy invented the wheel probably thought he was Completely Out of It, and so it was for a long time with the aviation industry and the human engineers. But then, when they were putting together the earlier aircraft, all they had to do when they got the cockpit finished was stick a chair in it and a human in the chair and they were set to go. With today's hairbreadth cockpits, this is no longer possible.

These people concern themselves with shaping the machines around the men who use them, both in a mechanical and a functional way. They realize that a seat that hits you wrong in the back may be okay for a while, but on a three-or-four-hour hop it can become intolerable. They are beginning to find that an aircraft may be beautifully instrumented, but if the instruments aren't understandable, and quick-

ly, that you might as well have a panel full of cuckoo clocks. They're even paying attention to the little things like the projection that tears your flight suit every time you climb aboard, or the overhead gadget that drips hydraulic fluid into your box lunch. And they've made some progress, but they've got a long way to go.

They work hand-in-glove with crash analysis experts in delethalizing aircraft—that is, in minimizing the number of ways a man can get injured in a crash. In one model, they removed a radio set that had rung up a series of three broken thighs in minor accidents. They conduct research on things like whether it's better to put a series of toggle switches or knob type switches on a panel. And if knobs are better, they can cite a recent eight-page article dealing with whether it's better to "stack" the knobs or place them side by side.

They are invading the sanctum sanctorum of aviation and taking the cudgel to some of our most cherished antiquities. Very soon, in some aircraft, the "stick" will disappear, to be replaced by a little gadget you can wiggle with one finger. They're even taking a crack at the instrument panel, saying that the only thing it's good for is to amaze small boys and Sweet Young Things who ooh and aah when they come up to the cockpit for a look and ask, "How do you ever manage to watch all those little clocks?" and you grin sheepishly, because part of the time you can't.

They love to draw diagrams showing the human as a link in a continuous circuit. They point out that ways must be found to fit the circuit to the human, rather than vice versa, humans being, so to speak, inalterable. Their creed is that if a system cannot accommodate a man both physically and within limits of his performance, then the system must be either discarded or modified. And they're right. So right.

From a position of ridicule, they're gaining much respect, even from old hard-bitten types who used to think all these fancy gadgets to help you fly were so much nonsense. They point out, with precise timing, that at mach 5 and 2500 feet, if a pilot should sneeze, he would be dead before he finished sneezing (if he happened to pop the stick over).

It was human engineering that got the manufacturers making gear handles shaped like wheels, flap handles shaped like flaps. Now they're campaigning for a standard cockpit for all aircraft so you won't have to change all your habit patterns and reaction sequences in the critical first few hours in a new type aircraft (when you have so many other things to think about).

Take, for instance, some of the new instruments. Back in the days of needle-ball airspeed only, it occurred to the people who were adding gages at a fabulous rate that in order to minimize the learning time, it would be well to shape the gages like something everyone knew and understood. What could be more familiar than a clock? But no one counted on having a million little clocks staring at you from that panel, all with hands pointing in different directions. Take, for example, the altimeter. This instrument has accounted for many more pilots than von-Richtofen and his whole circus. So they've redesigned it in a linear scale. There's a calibrated column with a little dot on it and the dot is you. No need to fight with three needles and a barberpole—when the little dot runs out of space at the bottom of the column, then you had better be intending to land, because that's where you're going to wind up shortly.

Another gadget up for change was the wheels indicator. The fuzzy dreamer who designed this didn't take into account the fact that, at a quick glance, the "U" in UP can look like the bottom of the little wheel the pilot is looking for in the window, especialy when there are three of them in a row. The fix for this is the "circle safe," a wonder gadget that will, if adopted, be a bigger boon than penicillin and the automatic can opener put together.

Still another area was the warning light system. One warning light is great—a real attention-getter, but two are less good, and when you have roughly a dozen staring at you, the shock effect is gone, especially if you're used to treating some of them as innocuous warning lights. The simple expedient was to replace them with flashers and a buzzer to attract attention, and further to accompany many engine instruments by a go-no go system of traffic lights, retaining the conventional indications for closer study.

Then someone noted that many accidents were caused because the man in the seat was watching inside instead of outside. So they tried other presentations, (including an ingenious projection device that projected an image of instruments on the horizon, but was scrapped because it was worthless in a dive). They devised a television tube that you could look either thru or at. And then they added a control that would let you select any combination of instruments you wanted for projection, so that you could maintain an orderly scan by the flick of a switch.

This, then, is the work of the human engineers—this, and a lot more. With aircraft becoming more complex every day, their work becomes more and more important. Because alloys, transistors, computers, systems, and what have you may come and go, but the Being, human, Mk I Mod O is here to stay.

—MAG-26 *Med. Bul.*

MONITOR

Promoting Engine Life

The staff maintenance officer outlined the salient factors directly affecting aviation safety discussed at the WestPac Maintenance Officers' Conference. The major item for discussion was the excessive number of premature engine changes since 1 January 1959. During this period a total of 105 R-3350 engines have been changed in WestPac; of these, only 9 were changed for high time. Sudden stoppages accounted for only 18 and the remainder, 78 were necessitated by failures or metal contamination. It was recommended that all commands place high priority on their program to decrease pilot- and maintenance-caused engine failures. Particular areas for concentration were increased supervision over engine checks and pre-oiling procedures, and accurate logging of oil consumption, continued vigilance by all pilots to avoid over and underboost.—*FAirWingSix*

Thinning Margins

Modern high performance military aircraft demand strict adherence to limitations and capabilities of specific aircraft and care must be taken to operate them within their design environment. A high degree of professionalism is important and anything less can often lead to tragic results from seemingly innocent situations. It is doubly valid that aviators keep their mental attitude in consonance with changing procedures and techniques, for what may have been allowable in an older design is marginal in a newer design. Additionally, it is important that the more experienced and older aviator exercise extreme care in his approach to the problem, because of his example to the younger inexperienced aviators.—*3rd MAW, El Toro*

Non-skid Ice

Brunswick's method proved successful in spreading sand when heated trucks were not available for distributing it on runways and taxiways during extreme cold temperatures. Sand was spread on the ice with a normal sand distributing truck followed by a fire truck spraying water on the sand with a fog nozzle. The minute amount of water was just enough to freeze the sand on the ice and gave a good non-skid surface.—*Northern Area.*

Sound Suppression

Emphasis was placed on personnel practicing self-protection from the serious injuries that can result from jet engine noise. There are only two possible ways in which this problem can be beaten. One is to insure the best protective devices known to the men working near jet aircraft, the second, to institute an accelerated and continuing program of education for these men concerning the dangers they are exposed to around these aircraft and the best possible methods of protecting their health.—*3rd MAW, El Toro*

EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Conflicting Weather Information

A discussion was held concerning the reports that occasionally pilots have received conflicting information about weather and runway conditions from the tower and GCA. The problem stems from the fact that visibility in this area changes rapidly, therefore the tower operator on occasion will pass information to the pilots or GCA that the visibility appears to be for example, 5 miles whereas the official observation taken 5 minutes earlier would be calling visibility 1.2 mile. The same is true with the rapidly changing wind and runway conditions. Majority of the Council members agreed that this supplemental advisory information, although in conflict with the official weather observation is desirable.—*Argentia*

Color Markings on Hangar Doors

The Miami Hangar is designed to permit aircraft to taxi in and out. Pilots have expressed difficulty in distinguishing from the cockpit whether or not the doors are fully open. The use of painted color markings on the hangar doors to indicate when the doors are fully open was requested in addition to painting wheel guide lines in the hangar bays.—*Alameda Safety Council*

No-Wind Runway

It was recommended that all stations designate a no-wind runway (3 knots or less) which would present the least obstacles to pilots and would not require aircraft to fly over congested or built-up areas on takeoff, thus minimizing the danger to personnel on the ground in the event of a crash.—*Eastern Atlantic & Med*

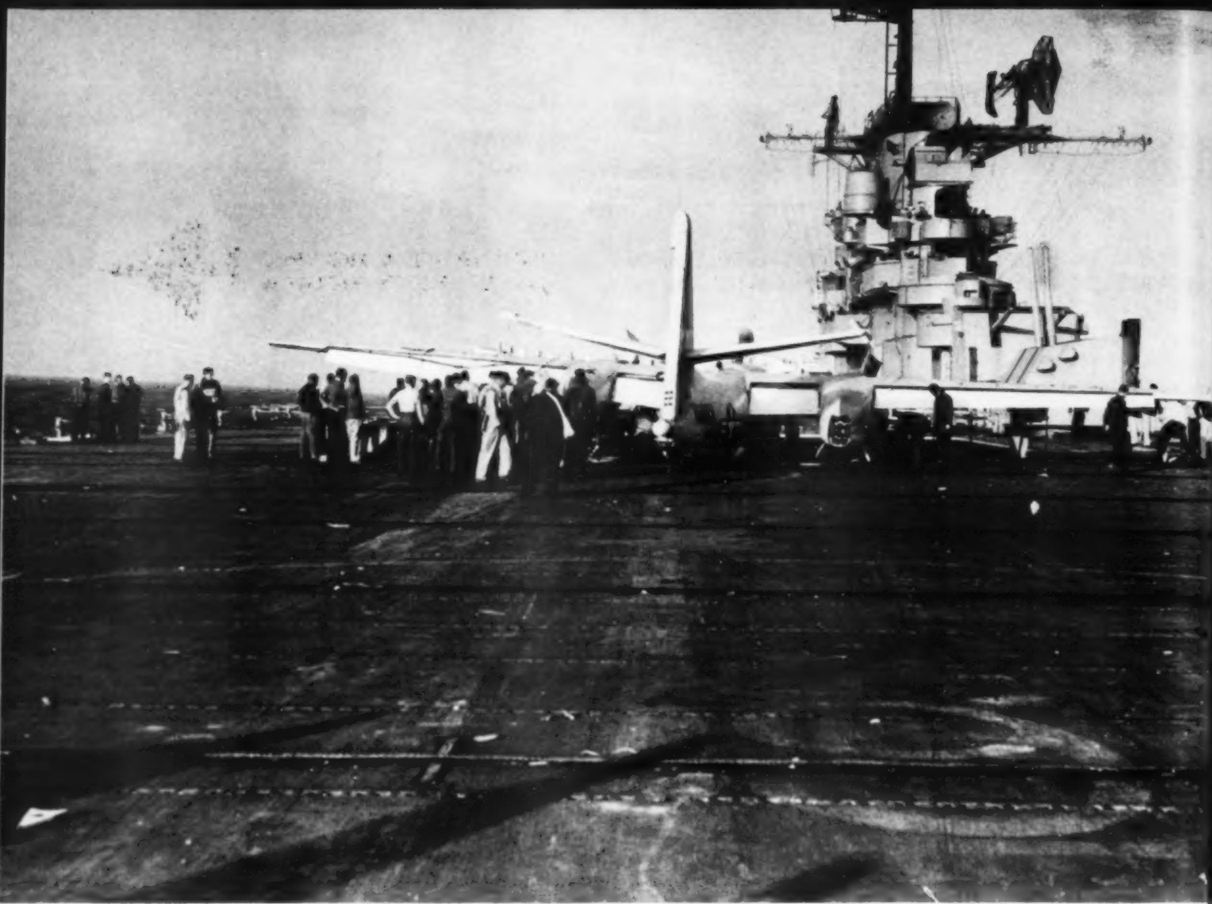
Quality Control

The quality control sections at the group level is paying dividends in the quality of maintenance throughout the wing. It is desired that all levels of maintenance have a quality control section. The personnel assigned to the section need not be assigned there as a primary job. In many units, quality control work is a secondary job within the various shops and sections of the squadron.

—*3rd MAW, El Toro*

Drag Racing Prohibited

All operators of ground handling equipment must be constantly instructed on the proper use of this vital, complicated and expensive equipment. Drag race and engine gunning artists cannot be tolerated.—*1st MAW*



WILD PITCH!

FOR 12 days the VS squadron had been on a qualification cruise and during that time both the squadron CO and LSO had lectured on landing transition technique and the danger of diving for the deck. On the day before the accident the commanding officer had repeated his lecture and the LSOs repeated the briefing for each launch.

This stress on correct deck landings was timely as the sea state did not allow much margin for error. Two fast moving storms had passed through the area in the previous 48 hours and on the day in question the seas were extremely rough with high swells from two directions.

Shortly before noon the S2F was launched on a routine ASW search to a maximum distance and return in time for recovery 4 hours later. The pilot had 700 total hours with 94 day and 10 night CV landings; however, his experience was limited to landing on relatively stable decks. Immediately prior to the launch a detailed briefing stressing landing on a pitching deck had been given by the LSO.

Though the flight had been scheduled for 4 hours the aircraft, due to an error by the pilots, arrived back over the carrier a half hour late. Five hundred pounds of fuel remained, not enough to get to an airfield, and the ship gave an immediate "Charlie." Weather at the ship

'...more of a collision than a landing.'

was good. There was an 8000-foot ceiling with 10 miles visibility but flight deck conditions were something else. The ramp was pitching an average of 40 feet or more with no rhythm to the pitch and the ship was rolling about 10 degrees. LSO attempts to communicate with the pilot were unsuccessful because of a loud squeal in the LSO transmitter.

To aggravate the situation the sun was low on the horizon and was in a direct line with the recovery course. The pilot's windshield was smeared with a greasy or oily film which the windshield wipers were unable to remove. Windshield anti-icing was attempted but the equipment did not function.

"On the first pass," the pilot recalled, "I took my own waveoff because I was unable to see the LSO due to the glare of the sun. For the remainder of the passes the LSO dropped the wind screen which helped a great deal although I still had some difficulty picking up the signals until fairly close to the ramp." Thereafter, from the 180 position until entering the groove, the copilot called off the LSO signals over the ICS.

The first four passes were waved off either by the LSO for improper technique or were initiated by the pilot when he became uncomfortable. At this point the pilot was highly perturbed. Concerned with his fuel remaining, he remarked to the copilot on his determination to get aboard to avoid having to ditch in the rough seas. Following the fourth waveoff the squadron skipper in pri-fly talked to the pilot, advising him in effect to take his time, get well set up and not to chase the deck as the LSO would cut him only if the deck was right for landing. This conversation had a reassuring effect on the pilot.

The fifth approach appeared to be normal to most observers. Slight discrepancies appeared between the various witnesses' statements as to the movements of the deck but the action described is believed to be accurate. A high dip was received and corrected for, then the "cut" came. "At the instant of the cut," the pilot said, "the deck appeared to pitch down badly and I had the feeling that I was going to float over the barriers into the pack." In that crucial instant, past instructions and advice were shoved aside. The yoke was pushed forward and the aircraft nosed down steeply. Then the deck started up. The yoke had already been pulled all the way back to flare but the situation was past remedy. A high sink rate had been established from which recovery was impossible. Impact between a rising deck and a descending aircraft ended in more of a collision than a landing.

The nosewheel hit first in the vicinity of number 1 wire and sheared. Slightly short of number 3 wire both main wheels struck the deck. The starboard gear assembly folded followed by buckling of the port gear; the fork of the main strut was driven through the top of the nacelle. Number 4 wire was picked up by the hook and the S2F slid to a stop.

Extensive damage resulted to the bottom of the fuselage from station 94 aft to station 300. All frames between these stations were torn or bent upward. The deck inside the fuselage was raised four inches and the main wing spar was bent upward. Almost all rivets at the starboard wing root were missing.

The finishing touch was applied to the wreckage by the port wheel. It had broken free on initial impact and began bounding along the flight deck. When the aircraft was brought to a stop the wheel caught up. It bounced up, hit the port flap a mighty whack and the flap folded like a wet noodle. Altogether, the aircraft was declared a strike.

"Pitching deck and pilot anxiety notwithstanding," commented the division commander in his endorsement, "a point of initial impact six feet forward of number 1 cross-deck pendant, from an essentially normal cut position and attitude furnishes adequate evidence of the reasonable expectancy of an uneventful landing . . . Finally, the advantage of accepting a possible barrier engagement in preference to a radical and uncompensated pushover after the cut has been for years a proven gambit."

SHORT SIGHTED—"I believe a few more night FCLP periods and a pad placed behind the parachute pack would have helped to prevent this accident." The pilot making this statement had a point. He was on his first night CV work when the accident happened and in the previous 30 days he had only one night field mirror practice period. In the preceding two months he had

four night practice periods. The recent time was considered inadequate preparation for night carrier qualification, particularly when day mission jet pilots are involved.

His past experience included 170 hours and 18 day CV landings in the F11F with over 100 CV landings in sweptwing aircraft and he had "previously demonstrated a consistent and professional type landing technique."

According to the accident board the F11F at 135 knots with a fuel weight of 2800 pounds affords minimum visibility to a *tall* pilot and very marginal visibility to a short pilot. The "long nose" version of the F11F had added nose length, added weight, and a higher instrument panel than the original "short nose" aircraft. Seat height had evidently remained the same. Back cushions and seat cushions are normally installed in the squadron aircraft but the pilot used an *additional* back cushion on all flights.

After being launched the pilot climbed to 500 feet and turned downwind. "I thought I was sitting lower than usual in the cockpit," he said, "so I loosened my shoulder harness and leaned forward to check for a seat pad behind the parachute. There was none . . . As I approached the ramp the meat ball went low and the LSO called for power several times. Power was added and attitude increased at which time I lost sight of the meat ball, mirror, and ship due to the attitude of the nose.

"This was followed almost immediately by a large and distinct thud in the aft section of the aircraft. My head snapped forward and I added full power and went into afterburner. The aircraft responded above all expectations. I climbed to 2500 feet and came out of burner. Everything appeared normal with the following exceptions; my tail hook light was ON, I was breathing faster than normal and I was shook.

"The accelerometer read only 2½ G which surprised me. The LSO called and said the hook hit the round-down and suggested I bingo to the beach. Another F11F rendezvoused with me and we proceeded to shore where the landing was uneventful." Repairs to the tail bumper, and aft fuselage were estimated at $12,-500.

Airborne successfully, following an earlier aborted takeoff, the F8U pilot was unaware of a sizzling hot wheel assembly which was soon to explode.

FOR WANT OF A BREAK—An F8U-1 section commenced an afterburner takeoff but after 2000 feet of ground roll and at a speed near 100 knots the wingman elected to abort due to difficulty with his afterburner. The wind was calm and 6000 feet of runway was available for stopping.

According to the pilot's statement he was fully aware of the brake overheat problem and he attempted to minimize brake temperatures. While transmitting his decision to abort he brought the throttle to IDLE, used aerodynamic braking then followed with wheel braking. He felt the braking action was no more than that required for a normal landing rollout.

After rolling nearly to the end of the runway, the F8U was turned to the right into a taxiway. Clearance was requested and received to return to the takeoff position. Rudder and nosewheel steering was used for directional control while taxiing back for a second try.

There was no delay in receiving takeoff clearance and shortly after becoming airborne the wingman sighted his section leader and joined up. The two jets climbed out toward their target area and at 14,000 feet the pilots switched to a tactical channel to be used during the ground support mission. Passing through 15,000 feet, less than 10 minutes after takeoff, the wingman felt a sharp, muffled explosion and a slight vibration

in the stick.

The section leader dropped back, looked the aircraft over and reported the port gear door missing with smoke coming from the area. Lowering the gear handle failed to produce a down indication on the port gear. By now there was fire in the wheel well and the pilot ejected on the advice of the section leader. Short seconds later the F8U torched off in a ball of orange flame. The pilot chuted down and landed without injury.

The villain in the case was heat generated in the brakes during the aborted takeoff. Wheel retraction following the second takeoff did not allow dissipation of the high temperatures and the tire explosion and fire was a consequence. It was noted by the accident board that the situation would have been prevented had the pilot not attempted a takeoff following the abort. For a philosophy of operation however, this is somewhat oversimplified. Other factors will influence both a pilot's choice of action and the command SOP.

One of these factors is a combat situation. A senior aviator in the chain of command directed his subordinate commanders to ensure that unit SOP include recommended procedures for in-flight cooling of hot brakes/wheels after takeoff under such conditions.

While the pilot was aware of the brake overheat problem and exercised caution while braking, his decision as to the amount and intensity of braking action used in the abort was based on the braking action required during a normal landing rollout. This is the area, said the squadron CO, wherein certain conditions existed which the pilot was not fully aware of when he made the decision to attempt a second takeoff following an abort.

Factors affecting the generation and dissipation of heat from a normal or fast landing:

1. The F8U-1 will be, in almost every instance, more than 5000 lbs lighter and require less braking action.
2. Initially the braking action is applied to cold discs and wheels.
3. After a landing rollout the heat involved has a much faster dissipation rate due to the wheels and brake assemblies being exposed to the passage of air over the heat areas during taxiing to the line and after the aircraft is shut down.

Factors affecting the generation and dissipation of heat as a result of a takeoff following an aborted takeoff:

1. During an aborted takeoff the F8U-1 will usually be over 5000 pounds heavier and will require more braking action, resulting in more heat being generated.
2. The heat generated above is applied to that heat already generated from the initial taxiing and brake usage.
3. Upon retraction of the landing gear after takeoff the coolant feature derived ffom outside air circulation is greatly reduced and results in a much slower heat dissipation than with the landing gear extended. This would also tend to raise the temperature within the wheel well.
4. Once the wheels have ceased rotating the transfer of heat from the brake assemblies is localized in the lower one-half of the wheel instead of the entire face of the wheel as happens during taxiing.

More On Speed Trap

Subsequent to the release of information included in APPROACH article "Speed Trap," June 1959, NASC completed a study of all field arrestments reported in the previous 12 months. Results emphasize the importance of center line engagements where possible. During this period there were 365 reported engagements and 1 attempted engagement in which the aircraft bounced over the arresting cable. The arresting gear functioned as designed in 340 engagements. Of the 25 failures on record, 9 were attributed to off-center engagements of between 20 and 40 feet, 2 to excessive aircraft speed, 2 to personnel error, and 13 to inadequate strength of the field arresting gear. Seven of the above failures occurred during aborted takeoffs and 18 during arrested landings. It was also noted that aborts on section takeoffs, full load takeoffs, and no-flap landings were more likely failures.

'FLIP' QUIZ

(Flight Information Publications)

1. What does the bracket around the number of a restricted area mean?
2. Where are ATC procedures found?
3. Where is information on DF found?
4. Which charts have compass roses?
5. Does the Flight Planning Chart show all airways?

See answers page 48

A GOOD APPROACH...

. . . is a precision maneuver designed to take advantage of your ability, your flying machine's characteristics, and the topography of the landing platform to effect a safe, smooth recovery of you and a very expensive piece of equipment entrusted to your care.

This came about for one reason, man is not a bird. His ability to fly is merely a measure of his ability to manipulate controls on a flying machine. The only thing Mother Nature provides, besides the material for the machine, is the medium in which the machine is at its best. Since the medium moves, we build landing platforms to take advantage of the direction of movement, thus reducing the speed of contact with our landing platform. Approach patterns are set accordingly.

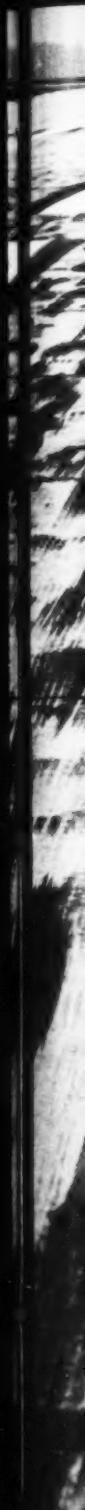
Successful landings have been made from a split-S type of approach to a long, dragged out, power on straight in. This wide range of approaches only proves one thing. It is possible to get a plane down safely from anywhere around the field if you are proficient in the entire range. But the dictates of modern aviation require a controlled traffic pattern, controlled speeds and a standard approach. You are used to it and your landings are successful. You will notice, however, that any deviation from a standard approach requires more thought, more control movement and more precision. When you find yourself cut out in the pattern, you extend your downwind and you find yourself forced to crank in a little more attention and concentration. This is good. On the other hand, if the same situation arises and you find it doesn't concern you in the least, look out! Your complacency may put you in the toolies.

A bad approach is any non-standard approach. You know you can get down safely with a standard approach as you have done hundreds of times. But when you find yourself in an awkward position, do you cogitate for a few seconds to weigh the consequences of a bad landing? Generally not! You attempt to salvage the bad approach by pulling off more throttle or diving off altitude or any other maneuver or control movement that will put you in the slot at the right speed and altitude. Ask yourself, "What have I to gain by salvaging this approach?" The answer that should strike you right between the eyes is, "I'll get on the ground two minutes sooner, but I may not be able to walk away from my airplane."

Of course, the idea is never to make a bad approach. But this is not always possible nor is it always the pilot's fault. The records are filled with pilot statements, however, that have the same words in the last paragraph, "This accident could have been avoided if I had gone around again."

Why salvage a bad approach?

ComNavAirPac Bulletin



NAVCAD'S DIARY

BEING a NavCad, I am in the lower ranks of the flight students and along with this status go various duties that are not required of the officer students. We can usually be found in some remote corner of the readyroom, feeling more at home with our own contemporaries.

But it never fails when the most interesting subject arises, up strolls the squadron duty officer and casually remarks how untidy everything appears to him and it ought to be cleaned up. Now a NavCad's second duty to his country is to keep the area clean and neat. With cheery smiles, we all launch our brooms and commence to sweep down fore and aft.

On the day in which my story takes place there was a loud silence on the flight line. All the yellow birds were tied neatly in rows and the forecaster said they'd probably stay that way all day and night. Yes, it was another of those days when I would wade back to my room, splashing through several inches of Florida sunshine.

While waiting for the hours to pass my attention was suddenly caught by the bulkheads decorated with the latest bulletins and flight posters. The safety officer had done a good job. There are book racks full of all the safety magazines and pamphlets that relive all the "hairy tales" of this year and last. Each work of literature contains at least several articles which pertain to every individual who comes in contact with an aircraft.

This was the thought that suddenly blazed in my NavCad skull: It was a type of day which encourages students to bone up on their flight and safety procedures! After all, no one can truthfully

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

say he knows everything about his aircraft's structural limitation or emergency procedures.

As I pondered this, the duty officer wandered in, made his gloomy observation about the need for a little cleanliness so forthwith I preflighted my broom. I didn't mind. This was a wonderful opportunity to check my theory and remain incognito at the same time. As I swept from desk to table, I observed with veiled eyes what particular subject each potential naval aviator chose to study this fine rainy day — procedures or safety.

My first victim was Ensign Rodney Hoarth, a graduate of Harvard Business School. I maneuvered my broom behind his soft sunken chair, casually glancing at the book he grasped.

He was totally engrossed in a volume of Carter Brown's "The Lover." Appalled as I was, I controlled the twitch in my cheek and managed to sweep on without apparent detection.

I did not realize it then, but this was only the beginning. Next I chose Lt.(jg) Orville Crumpton who came to the Training Command from an LST based in Uturoa, a small island in the Tuamotu Archipelago. He looked very happy to be here and was content with a volume of James Emmey's immortal "Lisbon After Dark." Startled, I lost control of my broom and it bounced off the chair. He never even looked up.

A group of four I ignored. They were carelessly throwing cards about a table and billowing gargantuan quantities of cigaret smoke into the air. They had been flying for five months now so I assumed they knew everything there was to know about flying.

My hopes revived as I swept toward a grim-faced individual. He presented a true picture of a professional military man. He had that "Go-Get-'Em" attitude of every true warrior.

Maneuvering closer I saw that with his emergency flip pad he was avidly crushing flies and keeping count of his kills on his knee pad. At any rate he was making use of his emergency procedures I thought sadly. Next to him, Ensign Loyd Lubeck and friend Elrod Jader were arguing whether or not the P2V could successfully be launched from a Sherman class destroyer.

By now I had accumulated a great pile of dust and was in the process of picking it up when Second Lt. Antonio Domiono stumbled across my broom handle. He was returning from the gedunk with an armful of goodies and now these were scattered about the readyroom. I helped him retrieve his vast fortune of fig newtons, sardines, anchovies, egg omelet and a heaping bowl of ravioli. Then he wallowed to his private chair in the far corner, pulled out a book entitled "Aerial Cropdusting After Dark in Formation," and began to consume vast amounts of food and knowledge.

Two can play at this game was my thought. I banged the dust pan loudly against the GI can, clearing off the last shreds of candy wrappings, and turned back towards the group. Much wiser now, I felt humble in the presence of greatness. NavCad Wulfgang Fudernic was thumbing idly through a copy of "Naval Officer's Guide" as I walked over and began discussing the prospects of the Modern Jazz Quartet with him. We quickly and seriously got down to business with the semantics of their latest LP entitled "Progressive Inclinations Toward Bach."

WIND BLOWN

A WV-2 was parked in one of the hangar bays, when an engine stand was blown into the tail section of the aircraft, damaging the lower half of the port vertical stabilizer.

Cause: One of the hangar doors was left open creating a strong draft of wind which had enough force behind it to move the platform having wheels on it. This occurred in the early part of the morning when but a very few personnel were around.

Anymech recommends making sure that all doors not in use are closed and that movable gear have parking brakes on them.

STATIC DISCHARGE

I WAS returning to home base, flying a P2V-5F with a crew of 12, after a fam hop to a European field. Clearance altitude was 4500 and I was briefed to expect a cold front about one hour after takeoff.

Thirty minutes from departure we began to hit scattered snow showers and shortly thereafter we entered a particularly dense shower. The flakes were extremely large and visibility was about wingtip distance. A couple of minutes later, while still in the snow shower, several members of the crew noticed a slight hissing in their headsets which was immediately followed by a tremendous crash of lighting and a great rush of cold air throughout the aircraft.

No contact could be made with the bow observer on ICS. A half a minute later he got back to the cockpit and reported that the nose had been completely blown away. The after station reported the tail cone split with a portion missing.

An emergency was declared and we received a UHF/DF steer to a field 60 miles away. A request for medical assistance upon arrival was passed to the field as the bow observer had numerous cuts on his face and neck and burns on both legs.

Because of the drag created by the missing bow, both jets had to be started and used to maintain altitude. Airspeed and altimeter readings became unreliable due to the burble effect around the pitot tubes. The tower told us a T-33

would be waiting over the field to guide us in and monitor our speed and altitude.

This incident happened in early December and the outside air temperature was minus 5° C. It was 30 minutes to the field and during that time we just about froze from the frigid air that swept through the aircraft.

The jet joined up and escorted us through a GCA with 145 knots used on final. Touchdown was around 125 knots on a taxiway 75 feet wide but 10,000 feet long (the runway was down for repairs). During the postflight inspection it was found that both props had been damaged by sections of the bow and the overhead antenna had been cut. Most of the plexiglass had carried away but pieces were found throughout the aircraft interior. A portion of the bow oxygen regulator was found under the navigator's table.

Later investigations concluded the explosion was created by a static discharge rather than lightning. Between the plexiglass and the metal attaching ring of the bow is a fiberglass insulator which prevents a static buildup from readily discharging through the aircraft. We have attached copper bonding wire from the plexiglass to the aircraft in hopes of avoiding a similar incident.

PERFECT SET-UP

I WAS flying an F11F and was on the wing of an F3H while returning to our carrier after a practice sweep on Okinawa. We were held outbound from the ship, 265 degrees, 26 thousand feet then commenced the letdown on a heading of 085 degrees at 250 knots.

Passing through 12 thousand feet (the weather was clear) I looked up in time to see two other F11Fs pass under us on an opposite heading. They were travelling at 450 knots, which made a hairy 700-knot closing speed. Clearance was less than 200 feet between sections.

The near-miss was reported to air ops after landing and it was found that all outbound strike aircraft were climbing out on a heading directly opposite to the letdown heading. It so happened that the marshall point was between the ship and the target. The marshall point was immediately changed.

I mention this incident simply because any of the returning pilots and the ship could have figured out what might happen with the marshall point on a direct line between the ship and target. However, none, including myself, did.

Carrier aviation affords enough thrills for me without such near-misses.

MIX DOWN

FOR the second time in a month a fuel truck labeled 115/145 AvGas has been dispatched to my prop aircraft with the fuel in the truck a mixture of 115 and JP.

The truck came out at night to fuel the aircraft but I had sent the crew to chow so no fuel was transferred. In the morning we got the same truck and discovered the contaminated fuel at that time.

I have ordered my crew chief to drain a bottle of fuel from the truck before refueling and check it for color, etc., *before* putting any fuel in the aircraft. This is to be done *every* time the aircraft is refueled.

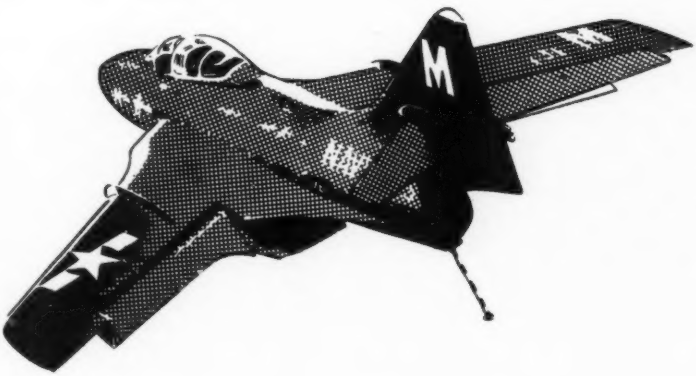
LIGHT UP

AT the end of a three-hour night round robin in an HSS-1 we commenced shooting touch-and-go landings at home field. Before touchdown on the fourth landing, with the copilot at the controls, the magnetic chip detector warning light came ON. I told the copilot to land and stay on deck.

All instruments were normal except the oil temperature gage which was high but still within limits. As we were ground taxiing back to the line I noticed the oil temperature rising rapidly. The engine was cut just as the oil temp gage pegged. Smoke coming from the engine was reported by the crewman riding in the cabin.

From the time the light came ON until we cut the engine was less than one minute. No oil leaks were visible but no oil was showing on the dip stick. After one hour about one gallon was indicated on the dip stick. The oil sump plugs and strainer were pulled, revealing a considerable amount of metal shavings.

If it had not been for the chip detector warning light we would, in all probability, have had an engine failure in flight as I don't think the oil temperature gage would have given enough warning. I certainly recommend installing the chip detector in all HSS helos.



COUGAR CAPER

ON A TEST hop after a fuel control change the *Cougar* engine suddenly surged to an overspeed and overtemp. I was at 10,000 feet and as the instruments indicated normal below 95 percent I decided to burn down in an orbit over the field rather than chance a heavy landing. The tower told me that if I desired an arrested landing the gear (chain-type) was rigged.

When down to 3000 pounds of fuel I started a flameout approach. I hit high key at the handbook altitude, airspeed and configuration. An emergency had not been declared because everything seemed normal and I thought all was well. I made the simulated flameout approach mostly because I'd made several for practice a few days before and I just wanted to see if I still had the gouge.

Passing through 1500 feet, just prior to rolling out on runway centerline the aircraft started decelerating at an abnormal rate. The TPT and RPM were dropping very rapidly and did not respond to throttle changes. Flameout! Speedbrakes were snapped up and I concentrated on landing the aircraft.

Touchdown was slightly fast about 1000 feet past the threshold. Being somewhat shook by the unexpected flameout I misread the 5000-foot marker as the 3000-foot marker. As a consequence I dropped the hook prematurely: The tower had told me to drop the hook by the 3000-foot marker but not prior to the 4000-foot marker.

My hook caught the cable for the reciprocal runway but fortunately the chains were not connected to the cable. I rolled on down the duty dragging the cable and came to a stop about 10 feet short of the rigged arresting gear. No damage was done to the aircraft.

After this I will not assume everything is all right when indications return to normal after a malfunction. Any type of malfunction involving engine performance should be worth a precautionary flameout approach and crash crews standing by. The cost of getting the crash crew out is a lot less than one airplane or pilot.

HOODED

IT WAS dusk when I took off in an F9F-8T with a dual pilot in the back seat for a night fam and instrument hop. This was the first night jet hop the squadron had allowed during the five months I had been aboard. Shortly after takeoff the RMI and Tacan went out.

This was a Tacan only aircraft but ceiling and visibility were unlimited so I decided to continue the hop in the local area. When we were down to landing weight we were over home field and I decided to land. I set up an approach with 3200 pounds at 140 knots.

On final I noticed that the threshhold lights were quite a distance from the runway lights. It didn't really sink in as I was concentrating on the landing itself and gave the odd lighting no more thought.

Touchdown was planned for as much rollout distance as possible and the tires screeched on hard surface about 200 feet beyond the point where the runway lights began. Aerodynamic braking was started but as the aircraft began to slow slightly I saw the "4000-foot remaining" marker shoot by. I immediately dropped the nose to the deck, raised the flaps and got on the brakes.

The brakes were hot and the tires worn thin by the time I was coming up on the end of the runway but I was slow enough to make the turn onto a taxiway. I couldn't figure out what went wrong until I found out what the tower hadn't told me.

The first 2000 feet of that precious 8000-foot runway was completely dark. The runway lights unbeknownst to us had been hooded for night MLP. I called the station ODO and he admitted that until my incident he was unaware that the lights had been hooded. Checking further I was unable to find any published word, NOTAM or verbal info that the lights were to be hooded.

Have a problem,

or a question?

Send it to

headmouse

he'll do his best to help.

AF Barrier Engagements

Dear Headmouse:

During a recent flight of a TV-2 to one of the USAF Air Training Command bases, the pilot lost all braking action. Jet barriers (Type MA-1A) were available. The pilot elected to land and engage the barrier. On landing he touched down 1000 feet down the runway, pulled up wing flaps and opened the canopy; however, he failed to retract his speed brakes. The aircraft struck the barrier at approximately 50 knots. Barrier activation was complete; however, due to the speed brakes being down, the cable only made a partial arresting with the right main gear, causing the aircraft to swerve to the right causing minor damage to the aircraft.

In view of the fact that the pilot was not familiar with the proper aircraft configuration for making a successful barrier engagement at an Air Force Base, it is felt that this would be a salient topic for your APPROACH Magazine.

LOUIS A. BLANCHARD
Major, USAF

► Two publications, NavAer 51-5A-501, handbook of operations for the MA-1A and the emergency chain type arresting gear bulletin number 7, offer the following information:

- Navy aircraft capable of arrestment with the MA-1A jet barrier are the F3D, FJ series, F9F series (without drop tanks), TV-2 and T2V. Air Force information indicates the TV-2 tip tanks may be retained.
- The dive brake on any jet fighter that is located under the fuselage between the main gear and the nose gear must be retracted before engagement.
- Use of brakes during engagements should be avoided as this tends to produce slack in the arresting cable, resulting in the possibility of losing the cable from the main gear struts.
- Off center engagements are successful and can be safely accomplished. It is much more important to engage the barrier with the aircraft head-on to the barrier, rather than to be angling toward the centerline at engagement.
- Excessive use of brakes prior to engagement should be avoided to prevent possible tire blowout and loss of directional control.

At Air Force installations the MA-1A barrier is remotely controlled from the control tower and the pilot is personally responsible for requesting that the barrier be raised or lowered as required. In each case the tower will advise the pilot of the barrier position. However when the tower suspects that a landing jet has radio failure the barrier will be raised.

Pooped Pilots

Dear Headmouse:

I'm a second-tour, 26-year old lieutenant type, P2V driver who believes himself to be in fine health . . . I sincerely believe that action should be taken to limit the duration of flights for all exercises and training missions to an absolute maximum of seven hours.

I for one, watch myself very closely during long duration flights and I have found my efficiency dropping drastically after the fifth consecutive hour of flight, and even more rapidly when I am engaged in prolonged periods at low altitude operations such as MAD or sonobuoy tactics.

My squadron had an aggressive safety program directed at everything but the physical and psychological well-being of the pilot. Naval aviators have no counterpart to the Airline Pilots Association to speak out for a limit to continuous flight time, but let's get realistic with the scheduling.

ANYMOUSE

► Operational and training requirements commonly require flights in excess of 7 hours. Therefore, we cannot state categorically, that all training flights be limited to 7 hours. It's agreed that MAD and sonobuoy flights are conducted at low level and that a couple of hours of this is quite strenuous. This is why there are at least 3 pilots in every VP crew. We do not concur that VP crews are overworked.

Very resp'y,
HEADMOUSE

Poopy Suit Outfitting

Dear Headmouse:

A pressing problem has been brought to my attention concerning the arrival of replacement pilots to a deployed, or an about to deploy, squadron. You may or may not be aware of the situation, but regardless, allow me to reiterate.

Replacement pilots are sent to squadrons sans the Mk IV anti-exposure suit. This in itself isn't a problem, IF the squadron is based ashore at the time. However, when the squadron is deployed, and is operating in cold weather conditions, the replacement pilot ar-

riving at that time is rendered useless to the squadron until he can obtain an anti-exposure suit. Unless shipboard supply and/or supply channels have changed drastically recently, it could take one month, and most probably two months, before he could be properly fitted for a poopy suit.

So, during this time, the poor guy hasn't been able to fly operationally at all. As a result, through no fault of his own, the replacement pilot has been placed in an unenviable and hazardous situation. When he finally does get a poopy suit, his first flight in a month or more will be from a carrier. Add to that the bulkiness and discomfort of a poopy suit, which he probably has never worn before, the Mediterranean's standard reduced visibility due to haze, and possibly relatively little knowledge of carrier operating procedures, then you have a nice juicy accident just begging to happen.

That's the problem—here is a solution. Have the RAG measure the pilots, requisition the materials, and send them both to the squadron. The fitting of the suit can easily be done on the squadron level. This way, there is no hardship imposed upon anyone, especially the poor victim, the replacement pilot.

This is definitely a problem of safety and supply. The replacement pilot should report to a squadron ready to fly; i.e. with a full supply of *appropriate* flight gear. Of course, the poopy suit will increase the weight of his baggage, pushing it over the 65 lb. limit. I think something should be done about that, also, but, comparatively, this problem is incidental when a pilot's safety is at stake.

SAFETY OFFICER

► The supply system appears inflexible on this one. Someone has to pay for the suit with Bravo funds. The RAG is not going to do it so it's impracticable to say they can give him one prior to deployment. The RAG could not order it and have it charged to the squadron.

Perhaps the RAG could measure the pilot and send a form memo to the squadron when the pilot receives orders. The squadron could then order the suit and fit and assemble it when the pilot reported aboard. Wish we could offer a better solution.

Very resp'y,
HEADMOUSE

Lights ON

Dear Headmouse:

Our command is lock-wiring all aircraft anti-collision lights in the "on" position. This insures that all maintenance personnel working outside the aircraft are aware when power is on. In addition, it aids the security guards at night as any unauthorized personnel turning power on will be signaling their action "loud and clear." I would recommend that all aircraft with rotating anti-collision beacons be similarly modified.

FASRON PILOT

► What you say sounds good as far as it goes, but there're a few extra things to consider. First of all, some stations and bases don't want your beacon on while you're taxiing—it confuses the pilots in the pattern. And if your night crew is working on several aircraft, your ramp may take on the appearance of a Roman festival. And the power consumption, while not great, is not negligible either—when you need to shut down all unnecessary electrical equipment you don't want to run an obstacle course to do it.

Another possible hazard is to the pilot flying in the soup. The rotating beacon can give him a horrendous case of vertigo — and what a time to be looking for a pair of wire snips. When you over-use anything beyond the purpose for which it was made, it tends to lose its significance and meaning—like the old story about the lad who cried, "wolf" too often. Also on ground it burns out the bulbs due to excess heat. The hazards and disadvantages in this case seem to outweigh the advantages.

Very resp'y,
HEADMOUSE

SMOKING MAYBE, WINDSHIELDS, NO

It has been reported that satisfactory rain repellent surfaces on the windshields of jet aircraft could be produced by vigorous rubbing of the windshield with a cloth bag of "Bull Durham" tobacco, and postulated that this effect was due to the exudation of various oils from the tobacco by frictional heat.

Naval Air Material Center conducted tests in which the application was made by placing the larger surface of the bag of Bull Durham on the cleaned, glass panel and rubbing vigorously for 2 minutes. To test the effect of the tobacco itself, a portion was removed from the bag, placed on the glass surface and also rubbed for 2 minutes with a piece of terry cloth. The applications were performed at room temperature and also at 130° F. in order to induce any exudation of tobacco oils. The panels were then tested on a visibility comparator machine and Steadman apparatus.

The results showed negligible repellency when so tested. A breakdown time of 1 to 3 minutes was attained on each of the machines. In comparison, approved materials lasted 8 hours on the visibility comparator and averaged 1 hour on the Steadman apparatus. Examination of the cloth and glass surface after each rubbing process showed no evidence of tobacco oil exudation.

As a result of this investigation, it is considered that the use of a bag of Bull Durham tobacco as a rain repellent was not satisfactory and is therefore not recommended for this purpose.

Very resp'y,
HEADMOUSE

Fire Two!

FOR years, improved ejection devices have been sought. While our current ejection seat has been performing with record success for many months, it is gratifying to note the gradual and so far successful introduction of low altitude capability seats such as the Martin-Baker and the North American rocket seats in naval aircraft.

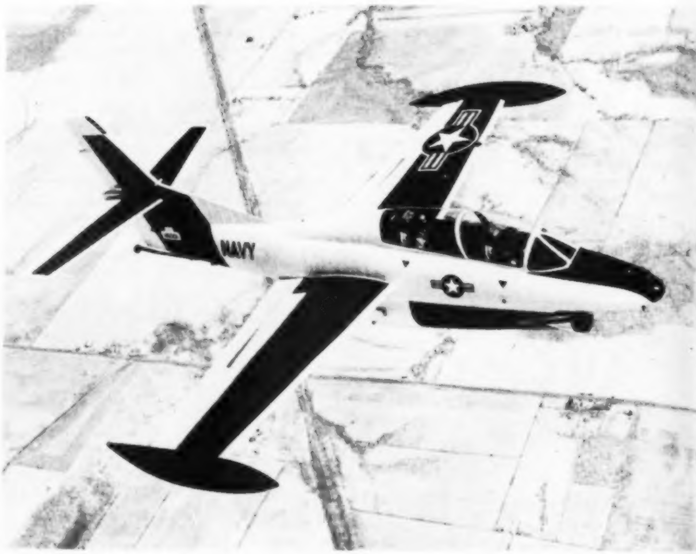
The Navy's new rocket-propelled ejection seat incorporating the unique command selector firing system has proved 100 percent successful in its first operational ejection in naval aviation. The system was developed for BuAer by North American Aviation.

The ejection took place in September when two pilots at NAS Pensacola ejected in tandem sequence from their T2J when the compressor section fire warning light came ON. Their altitude at the time was 800 feet, speed 115 knots. Both men were recovered from the water shortly afterward uninjured.

A Pax River test pilot was the first Navy pilot to eject in the new rocket-propelled seat earlier this year. While on a roll performance flight, the YT2J-1 went into an uncontrollable left roll. The pilot ejected inverted, at 1500 feet altitude and at a speed of over 450 knots. The pilot never lost consciousness although he sustained Charlie injuries. He immediately requested one of his rescuers to retrieve the ejection seat D-ring and save it for him.

The T2J ejection system offers many advantages:

- Successful low-level ejection (from 75 knots at ground level) as well as stabilized ejection at altitude.

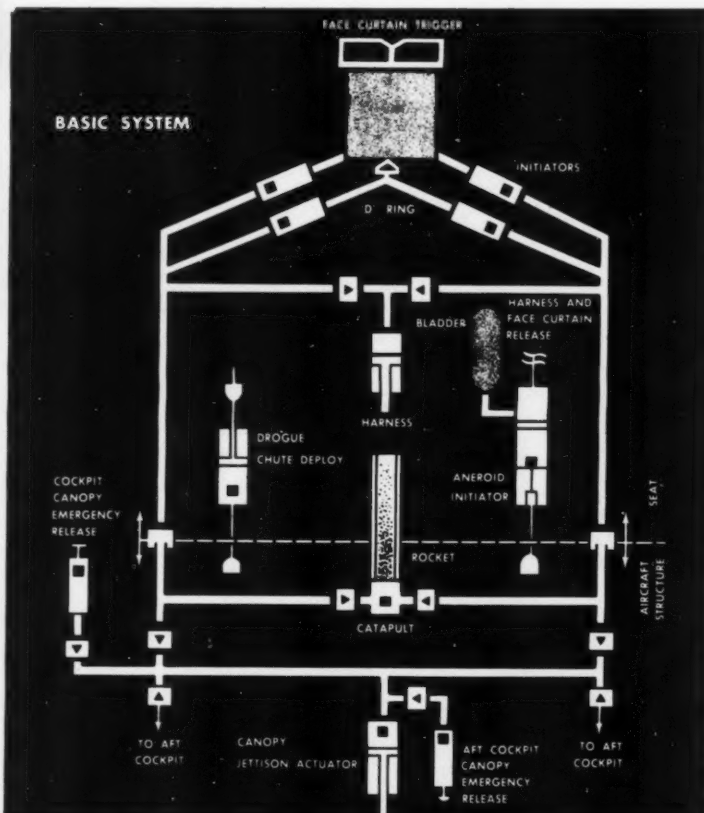


- G-load on the crewmember from ejection considerably lower than experienced in the conventional Navy seat.
- Automatic ballistic inertia reel to position the occupant's shoulders prior to ejection.
- Reliability through parallel gas systems.
- A gas system requiring no maintenance except periodic inspections.
- Both automatic and manual separation from the seat after ejection do not require manual operation of the parachute in this system.
- And its most unique feature: the command selector system which allows the instructor to eject his student and himself in less than one second with a single initiating action.

How does this new rocket-propelled ejection system work?

The ejection sequence is initiated by either pulling the face curtain B-ring overhead or the seat D-ring between the crewmember's knees. There are no pre-ejection routines to perform such as "*PRE-POS-OX-PULL.*" Pulling either the face curtain or the D-ring will fire two cartridges which in turn generate gas which flows through parallel independent systems (see diagrams). Simultaneously this (1) jettisons the canopy; (2) activates the ballistic inertia reel which takes up any slack in the integrated harness and locks the crewmember back and erect in the seat; and (3) ig-

Fire Two! . . . and with just one pull of a face curtain or D-ring. That's one of the unique aspects of the rocket-propelled ejection system in the T2J *Buckeye*—when the instructor decides it's time to go, he doesn't have to invite the student to abandon likewise, he just goes and the student goes too. Then too, if either occupant is incapacitated the other party can Fire Two out — no trepidations about leaving someone behind, even a non-pilot passenger can safely shoot both occupants to earth if the pilot is unable to fly and land safely.

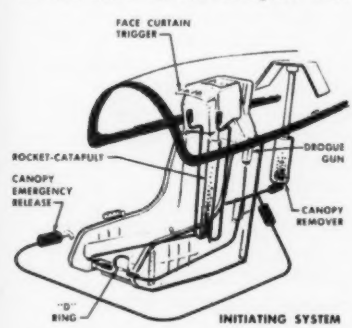


The gas-energized operating system is dualed for positive action. . . This representative schematic illustrates the parallel routing of the basic sub-sonic system.

nites a ballistic time delay in the rocket catapult before the seat is ejected 4/10 of a second later. (The delay allows time for the canopy to jettison and the crewmember's body to be positioned by the ballistic inertia reel.)

This feature of routing the four initiators (two for the B-ring and two for the D-ring) separately to dual igniters in the seat catapult multiplies dependability. Any one of the four initiators is capable of activating the escape.

At the end of the 4/10-second time delay, the seat is ejected by rocket catapult (through the canopy if it has failed to jettison). The firing of the catapult charge in the base of the catapult tube



The elaboration of the system for supersonic capabilities (aerodynamic surfaces, retention devices and a more detailed time-delay schedule) is tied directly to this basic layout.

starts the seat up the cockpit rails. Oxygen, anti-G suit and communication leads separate at the composite quick-disconnect on the seat. The bailout oxygen bottle in the seat pack is actuated. The firing of the catapult ignites the rocket charge in the inner cylinder of the catapult tube which is attached to the seat. As the seat leaves the aircraft, it becomes a free-flight air vehicle with inherent aerodynamic stability gained by balancing the seat-man mass to the thrust of the rocket and dynamic forces.

Man Goes Out of Aircraft

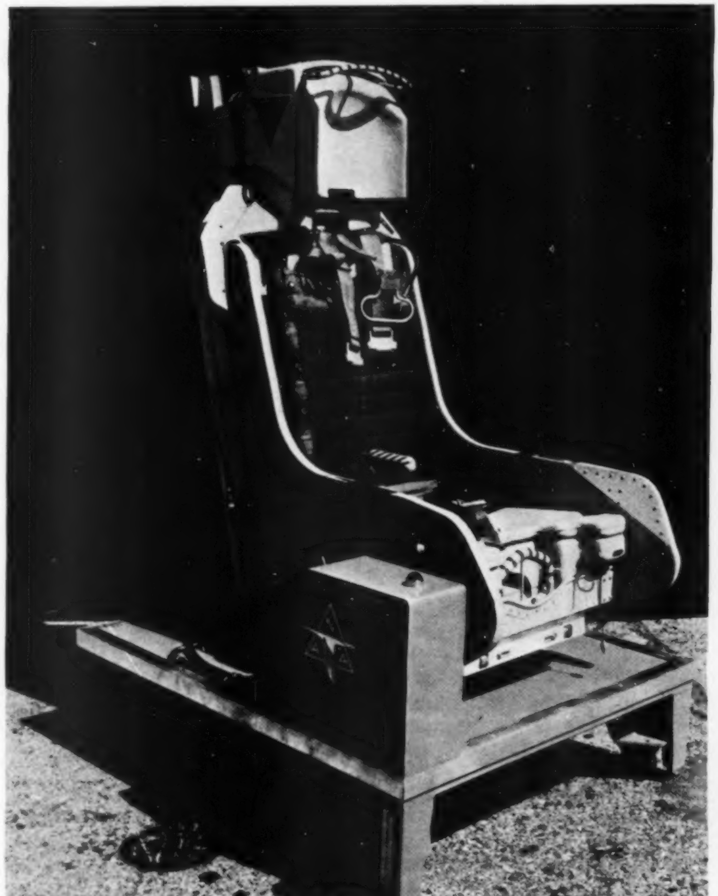
As the man goes out of the aircraft, a striker is tripped which forcibly deploys a drogue chute from its stowage in the headrest to effect controlled seat-man deceleration and stability. This same striker actuates an aneroid delay mechanism for seat separation and parachute deployment. If ejection is made at high altitude, the separation system is locked out by an aneroid until the seat-man combination has free-fallen to 13,000 feet. On aneroid actuation, or after a .52-second delay if ejection is made below 13,000 feet, the harness release thruster is actuated.

Man is Released from Seat

The first portion of the harness release thruster travel releases the man from the seat. The second portion of thruster travel releases gas which actuates cutters to sever the face curtain and inflates two bladders, one in the seat-pan and another in the seat-back. These inflated bladders force the man from the seat.

As the man leaves the seat, a lanyard attached to the seat is pulled and an automatic parachute opener aneroid unit is armed. The parachute opening aneroid is set for 10,000 feet. After a 3/4-second delay under 10,000 feet the parachute (an NB-7) opens. The seat-man separation and personnel parachute deployment sequence has optional manual override. Manual seat separation after ejection does *not* require manual parachute actuation *in this system.*

The survival pack enclosed in the seat cushion remains attached to the crewmember. Prior to landing, the crewmember can operate a release handle on the kit which will detach the lower half of the kit and suspend the survival equipment stowage bag and the life raft. As the raft falls to the length of the lanyard, its weight will open the raft's CO_2 cylinder and inflate the raft prior to landing.



Command Selector Feature a First

The T2J is the first aircraft ever equipped with a command selector ejection system. Basically, this system permits the instructor pilot to eject his student pilot as well as himself. The thinking behind this is obvious and logical—the senior pilot with his greater experience is more capable of recognizing emergencies and should have the prerogative of maintaining command in an emergency situation.

Under all conditions of ejection, the man in the rear cockpit is ejected first to prevent injury from the rocket blast from the front ejection seat.

Normally, the command selector lever is positioned to place the command in the cockpit of the instructor. However, if the instructor is incapacitated or disabled, the student can reposition the lever permitting him to eject both the instructor and himself. A warning light in the command selector handle goes ON whenever the control is being moved.

The man having the cockpit in command can eject both occupants of the aircraft. The man not in command can move the command selector for his cockpit and eject both occupants of the aircraft.

Without the command selector the man in the rear cockpit can only eject himself. This is not true for the front cockpit. If the man in the front cockpit pulls the B-ring on the face curtain or the D-ring on the seat without having the command selector in his cockpit, the canopy will not go and the seat will not fire (but the inertia reel will lock into position). The man can then pull the command selector into his cockpit to make a second ejection attempt but he *must* use his alternate firing control (the face curtain B-ring if he pulled the seat D-ring previously and vice versa).

If the man panics and uses his alternate firing control without first having repositioned the command selector, subsequent firing of his seat is possible only if the man in the rear cockpit with the command selector positioned to the rear fires both men out.

Miscellaneous Features

There are a number of other features of the rocket-propelled ejection system. The seat height can be adjusted electrically for pilot height. The Navy integrated harness system is worn with the system in the T2J. The seat pan pad is the cushion seat containing repackaged PK-2 survival gear. The gas energized system is maintenance-free aside from periodic inspections. There are no cables, pulleys or drums to adjust.

All in all, the new escape system of the T2J promises to be a valuable addition to the naval aviator's safety and survival equipment.

Suit Yourself

The latest word from BuAer on the Mark 5 anti-exposure suit is that 100 have been purchased for evaluation and that 500 more are under contract for evaluation by NavAirPac and NavAirLant squadrons. The suits in the second purchase have incorporated improvements determined desirable during the initial evaluation.

The new Mark 5 suit is a ventilated garment which operates on a blower in the aircraft. The suits will probably be evaluated by F4D, F8U, A4D and S2F squadrons. The F4D and the F8U have ventilated air available in their configurations. O&R Pensacola and Quonset have mocked-up blower installations for the A4D and the S2F. BuAer has engineering drawings available on these mock-ups.

In the meantime, the Mark 4 anti-exposure suit (the continuous-wear suit) and the R-1 anti-exposure suit (the quick-donning suit) are in use by the fleet.

For current information on the care and use of these anti-exposure suits, here are the applicable directives and references:

Current Directives on Anti-Exposure Suits

BACSEB 36A-54 (21 May 53)
Flying Suits, Anti-Exposure MK-4, -3 (Modified) Instructions for Fitting (Additional)

BACSEB 40-54 (27 Oct 53)
Suit, Anti-Exposure MK-3 and MK-4, Alternate Methods for Wearing

BACSEB 46-54 (12 May 54)
Suits, Anti-Exposure, Quick-Donning for Aviation Personnel

BACSEB 6-56 (19 June 56)
Suit Flying Anti-Exposure Continuous-Wear, MK-3

BACSEB 7-56 (9 July 56)
Suit Flying Anti-Exposure MK-4, Instructions for Fitting, Use and Care

OpNavInst 3710.7A (31 Dec 56)
General Flight and Operating Instructions for Naval Aircraft

Additional Reference Material:

NavAer 00-80T-52
Safety & Survival Equipment for Naval Aviation
NavAer 00-80T-56
Survival Training Guide
Indoctrination Film MN 7458B—
"MK-4 Anti-Exposure Suit"
BuMed *Medical News Letter:*
Vol. 27, No. 5—"Immersion Foot"
Vol. 28, No. 1—"Immersion Hypothermia"
Vol. 31, No. 12—"Cold Water Immersion"
Vol. 32, No. 10—"Navy Problems in Cold Weather Medicine"

Angel Pick-Up

THE plane guard helicopter arrived downwind of the ditched AD-5 within just a few seconds and approached one of the three survivors who appeared to be in the worst condition.

"As the weight came on the hoist," the helicopter pilot reports, "I noticed relatively high manifold pressure was required to hover. I checked the direction of the wind again and asked my crewman what the man was wearing to increase his weight. By this time the survivor was almost into the hatch and it was then that my crewman could see he still had his unopened seat chute on.

"Because the man had blood on his face and appeared to be injured, I decided to risk bringing him in the hatch with his chute on rather than lowering him again. The crewman had difficulty getting the hatch closed because part of the survivor's chute pack caught in it." (*If at all possible, survivors should always remove their parachute packs before helicopter rescue*, not only because the chute pack makes it difficult to enter the rescue sling, but because the wet pack is also unwelcome extra weight aboard the chopper.)

"Fortunately, we made it back to the carrier with no complications," the rescue pilot continues. "We unloaded the man and returned for the third person still in the water. (Another helicopter had rescued the second survivor in the meantime.) Our second pickup was conventional."

The helicopter pilot also reported difficulties encountered on his two pickups when *both men entered the sling backwards*. "The first man wouldn't or couldn't change his position," he states, "so we brought him up as he was. The second man quickly put the sling on properly when directed to do so." Both men stated that they had been through previous helicopter rescue sling pickup and indoctrination.

notes from your FLIGHT SURGEON

Judgment

ON THE return leg of a flight an S2F-1 landed in a farmer's field after running out of fuel. Fortunately, pilot, copilot and the two passengers were unhurt.

For no particular reason or need, the pilot and copilot had decided to try to make the flight non-stop. Both low fuel warning lights came ON about 100 miles from the destination. However, the pilot and copilot chose to ignore them, calculating they could reach home and have 20 minutes' fuel remaining. The starboard engine quit with the gage reading 50 pounds. The port engine stopped shortly thereafter. The rest is record. The pilot's only explanation was that "we wanted to see if we could make it." They couldn't.

"Their continuation of the flight without a pressing reason, with several fields available for landing, and with an obvious critical fuel shortage," the reporting flight surgeon states, "can only be considered poor judgement."

Five Miles From Shore . . .

FIVE miles from shore with a leaking PK-2 life raft and *no life vest* . . . This was the situation in which an F4D-1 pilot found himself recently after ejecting when a fuel system malfunction caused a flameout.

The slow leak in the pilot's life raft was caused by the CO_2 bottle connection and firing mechanism's rubbing against the raft while it was stowed in the pararaft assembly.

Fortunately, the pilot was picked up by helicopter 5 to 10 minutes after he entered the water.

He failed to wear his life vest on this flight because of what the AAR describes as a "lapse of memory." To quote one of the endorsers of the report, "this could easily have cost him his life."

Helmets

DURING a routine hop, fire broke out in the engine of an HO4S-3. The pilot started an autorotation intending to land on the beach of an island below. Noting a sand ledge about 3 feet high on the beach, he changed his course and attempted to land between the sand dunes. Excessive impact on landing caused the rotor to dip down and chop off the aircraft tail.

The pilot's shoulder harness and seat belt were locked but not tight. He did not have a chin strap on his APH-5 helmet. The helmet visor was up. The impact caused him to pitch forward, snapping his helmet off. His head struck an unidentified object which rendered him unconscious and caused a mild brain concussion. His injury necessitated an estimated 30 days on the sick list.

The crewman's shoulder harness and seat belt were locked and tight. He received no significant injuries. Although he had a chin strap on his APH-5 helmet, it was not tight; his helmet visor was up. He lost his helmet on impact.

APH-5 helmets should have nape straps and chin straps installed because of the helmet's rotating characteristic.

The S/PH-1 helmet is the helmet specifically designed for helicopter flight crew personnel (Ref. BAC-SEB 46-57). Issue of this helmet will be restricted to pilct and non-pilot crewmembers of HS squadrons and non-pilot crewmembers of VS squadrons until ample supplies of helmets are available.

In the Dark

TWO crewmen who survived a recent A3D-2 water crash at night were picked up by plane guard destroyer after 20 minutes in the water. The seastate was 8-foot swells at 6-second intervals. Neither man had a life raft. *Neither man used his flares or thought to turn on the flashlight on his life vest.* The destroyer spotted the survivors in the water by means of its searchlights.

The fact that neither man thought about his signal devices exemplifies the necessity for continual training and indoctrination in the use of personal survival equipment.

To Advise and Aid

"ALL pilots having personal, family medical problems should be reminded that one of the primary purposes of the flight surgeon is to aid and advise them as necessary."

—Flight Surgeon in Incident Report

Discussion Continued

"THERE has been some discussion concerning the most convenient location at which to attach the survival knife and scabbard. I have worn mine on my right leg, midway between my knee and hip, and have found this to be a very convenient location. It is readily accessible, not uncomfortable, has produced no injury and has stayed with me through one ejection and one ditching."

—Pilot in A4D-1 Accident

LOOSE ENDS

A West Coast A4D-2 was airborne for approximately 1 hour and 30 minutes, entered the touch-and-go pattern. After touchdown the aircraft took off and was cleared downwind and was about to turn when the pilot heard a buffeting sound which he dismissed as unimportant after checking all instruments. The pilot turned downwind climbing to 1300 feet. About one quarter of the way of downwind leg the pilot smelled a foreign odor and noticed the controls were stiffening. He attempted to notify the tower but found his radio inoperative. At the 180-degree position he noticed his gear indicators were showing barber poles. The flap indicator was off and oscillating, the EGT between 450° and 500°, and no fire warning light.

The pilot considered ejecting at this point, but, from the indications that he had, the situation did not warrant ejecting. He elected to continue his approach and make a final landing.

The pilot made a normal approach and landing, during which the RDO noticed dull red sparks coming from the aft fuselage section of the aircraft.

The tailpipe had become separated from the exhaust duct assembly and moved rearward six inches and to the left three inches (see photos left) permitting jet exhaust blast to escape and cause heat damage to aft fuselage components.

The accident board concluded that the cause of this accident was the failure of squadron maintenance personnel to lock-wire the Marmon clamp bolts during the PPM check, and the subsequent failure of the check-crew leader and the quality control inspector to spot this discrepancy in their post-check inspections.

It was recommended:

► That maintenance personnel be continually impressed with the importance of their job and the necessity of doing thorough and professional work, and that overlooking one small detail can lead to the possible loss of an aircraft and pilot.

► That the A4D-2 utilize only one type of Marmon clamp bolt—the type employing the self-locking nut.

► That the supply system discontinue issuing Marmon clamp 4062D15-A (lock-wire type) and issue clamp 4062D54, which employs self-locking nuts, in its stead.

Action Taken: The utilization, in one model aircraft, of two different types of tailpipe attaching clamps, Marmon or National Utilities Corporation, is considered conducive to maintenance error due to differences in technique required for installation. Action is being initiated to retain one type of tail pipe clamp for all assigned aircraft as a further means of achieving standardization and thereby reducing the possibility of repetition of installation error.

Same Song, Second Verse

A similar accident was experienced by an East Coast A4D-2 except that this aircraft never became airborne. During a routine jet calibration following an intermediate inspection the engine was run up for a full power check. The aft fuselage started smoking and paint discoloration appeared on top of the aft fuselage forward of the vertical stabilizer. The engine was immediately shutdown.

The aircraft received severe damage to the aft fuselage skin, formers and stringers. Wiring around the liquid oxygen flask and various control cables were burned. At no time did the fire warning system indicate fire or excessive heat. . .

In this case too, the Marmon clamp securing the tailpipe to the exhaust cone was improperly installed, not torqued, and not lock-wired. The loose clamp allowed heat to escape upon application of high power.

The squadron has instituted a system of maintenance quality control as required by BuAer Inst. 5440.2 resulting in increased supervision and a more reliable inspection procedure.

Conclusion & Recommendations from Selected Engine Disassembly and Inspection Reports

(For use by operating and supporting activities)

J33-A-18 Two engines were returned to overhaul for turbine diffuser failures while installed in guided missiles.

Conclusions: (a) The melted and disintegrated condition of the turbine diffusers indicate a lack of or insufficient inlet cooling air to the turbine diffusers.

(b) The filter screens of the fuel nozzles part No. 5230597 were found to be heavily contaminated with salt and silt materials (see photo). The air adapter fuel filters part No. 6719757 were found to be in a similar condition. Disassembly of the fuel control and main fuel filters revealed moderate deposits of salt and silt materials.

Recommendations: (a) That maintenance and operating personnel assure compliance with instructions in Maintenance Handbooks NA-02B-5CA-502 and NA-01-45JAE-502 (Missile) as follows: "Keep ground operation at 100% (11,750) rpm and above to a minimum. Do not operate an installed engine for more than one minute at 100% or above with access doors closed as there is danger of damaging the turbine cooling fan."

(b) It was determined that the contaminated engine fuel system did not appreciably affect the functioning of these engines. However, continued operations without a thorough cleaning of the fuel system would have resulted in an engine malfunc-

tion. It was recommended that the following directives be strictly adhered to in order to eliminate water accumulations and to prevent engine malfunctions due to water and foreign matter accumulations in the fuel systems:

► Technical Order No. 49-54 of 31 December 1954. Subject: Daily draining of Aircraft Fuel Systems to remove water and detect foreign matter.

► Technical Order No. 1-57 of 15 July 1957 (Superseded by BuAer NavAer06.15 of 10 June 1959). Subject: Aviation Fuel Contamination and Visual Quality Standard for Aviation Fuels.

► Technical Order No. 2-57 of 1 August 1957. Subject: Quality Control and Surveillance of Aviation Fuels.

Note: BuAer disp 171351Z Aug 1959 NOTAL concurred with the above listed recommendations.

J33-A-20 Engine returned to overhaul for Number 4 bearing failure.

Conclusions: The No. 4 bearing failure was of a progressive nature extending over a period of time. The inner race of the failed bearing failed on one side. The gradual wear on one side of the inner race caused excessive vibration of the turbine wheel, resulting in three broken blades and damage to the nozzle diaphragm, turbine bearing support ring and shroud.

Recommendations: A periodic oil strainer check for metal contamination of oil.

J57-P-8 Engine removed for high compressor damage revealed, among other discrepancies, a fuel control temperature sensing bellows of the capillary tube part No. 514692 to be severely bent.

Conclusions: The fuel control temperature sensing bellows was bent by improper removal procedures in the field. Construction of the temperature bellows housing prevents removal of the bellows without completely disassembling the housing assembly. The bellows was replaced and the fuel control operated satisfactorily.

Recommendations: That no field maintenance be performed on the integral parts of the fuel control, other than those outlined in the applicable service instruction, NavAer 02B-10ADC-502.

J65-W-16A Engine was returned to overhaul due to metal contamination and fluctuating oil pressure. Engine was received without oil pump at the overhaul activity.

Conclusions: (a) Oil contamination believed caused by a scored bevel gear box front bearing.

(b) Oil pressure fluctuation was caused by a missing seal part No. 227906 in the oil tank vent valve. It is believed that the oil pressure fluctuation from 10 to 22 psi during zero to negative 1-G maneuvers was caused by the oil tank sump valve's inability to close during the negative G condition. This was due to the sump valve seal being dislocated and holding the valve open. This resulted in air being taken into oil pump.

Recommendations: (a) That oil pumps remain with the engine when special investigations of malfunctions are requested.

(b) That operating activities inspect the increased capacity oil tanks periodically to assure that the seals on both the vent valve and sump valve are in place.

J65-W-16A Engine removed for metal contamination after only 40 hours service since overhaul. Operating unit states that no contamination was found during strainer check prior to pre-oiling at the 30-hour time interval since overhaul.

Conclusions: It is believed that metal particles may have been inadvertently introduced into the oil system during pre-oiling of the front main bearing support location. No source of metal particles was found during a close examination of the engine and components on disassembly.

Recommendations: Comply with pre-oiling instructions in the Handbook of Service Instructions, AN 02B-35AAC-2. Insure that a filter is installed on the pre-oiling rig and that the equipment and engine oil are free of contamination.

J65-W-18 Engine returned to overhaul for a suspected center main bearing failure and turbine blades burned and damaged.

Conclusions: Turbine blades stretched .047″ plus that metal which was worn off from tip rub. Blade stretch indicated an overtemperature condition. The fuel control acceleration was found to be 5 percent over rich from 75 to 100% at sea level and 11 percent over rich at 15,000 to 35,000 feet altitude. At disassembly the thermostat bellows was .010″ shorter than the inscribed height on the part at manufacture. The aneroid bellows was .009″ shorter than the inscribed height on the part at manufacture. Both the aneroid and thermostat bellows have overhaul acceptance limits of plus/minus .007″ from the inscribed height at manufacture. The shortened condition of both bellows were direct causes of over-richness.

Recommendations: It was recommended that operating activities monitor the acceleration time of their engines. To evaluate the engine trim condition for a given fuel control and engine combination, a decrease in acceleration time is indicative of a rich drift in the fuel control. Prolonged use of a rich fuel control could lead to hot section damage in the engine. ●

FOREIGN OBJECTS IDENTIFIED

All ten stations having the new MC-1 runway vacuum sweeper report reductions in jet engines damaged by runway debris—But, DIRs show aircraft maintenance hardware left in engines and ducts is still Jet Enemy No. 1

A REVIEW of Jet Engine Disassembly and Inspection Reports received by the Naval Aviation Safety Center reveals that an alarming number of engines are still being sent to overhaul activities for damage incurred by foreign objects. Screening of these reports disclosed that although a large number of these engines sustained damage from "Unidentified Foreign Object(s)" many sustained damage from "Identified Foreign Objects." In February 1959, APPROACH published a listing of 42 engines that were damaged by identified foreign objects during the period 1 Jan 1958 through 31 Dec 1958, at a total damage repair cost of $316,000.

(Please turn page)

During the subsequent seven-month period from 1 Jan 1959 through 31 July 1959 things *did not* improve.

In fact they got worse—*much worse* as evidenced by the following: Engine Disassembly and Inspection Reports (DIRs) for this period reveal that an additional 59 engines were returned to overhaul activities due to damage by identified foreign objects. Review of these *IDENTIFIED* items disclosed that many of them were common hand tools and hardware that are used by maintenance and line servicing personnel everyday.

The foregoing clearly indicates an intolerable condition of *no*, or to say the least, *inadequate supervision* and *inspection* during and after completion of work and prior to turn-up and flight. There is no doubt that aircraft ground maneuvering contributes to foreign object damage by the picking up of debris from nose wheel tires and runways; however, it is difficult to believe that many heavy tools, flashlights and articles of clothing are being ingested in this manner.

Although adequate implementing directives have been promulgated by major commands it appears that, based on information provided by the DIRs, FOD programs in operating squadrons/activities are either not adequately established or, are not actively pursued, enforced and *strictly supervised*.

If this needless waste of dollars, material, manhours and operational readiness is to be reduced it is mandatory that all activities review existing instructions and adopt a positive approach, attitude and procedure toward elimination of this highly unsatisfactory condition.

Following are some policies and procedures which, if adopted, actively pursued, strictly enforced and constantly supervised, will go far toward elimination of foreign object damage to jet engines:

(1) Establish and enforce inspection procedures to detect foreign objects in inlet ducts, engine compartments and areas forward of inlet ducts on all aircraft.

(2) Inspect closely to insure that all authorized equipage is secured properly both outside the aircraft and in the cockpit and other recesses.

(3) Establish and actively pursue a procedure for meticulous policing of turn-up and taxi areas, paying particular attention to padeyes and crevices. The areas bordering the taxi lanes, turn-up areas and compass rose are other sources of foreign objects and debris and very strict policing must be done to be effective.

(4) Establish a policy and procedure for positive accounting of all tools at all times. Personnel must assure that all tools are back in their respective boxes or lockers prior to an engine start. Arrangements for moving any aircraft to turn-up areas for post maintenance engine runs should be made only on completion of check, inspection of aircraft for FOD hazards, and tool inventory. Moving aircraft prior to completion of these inspections sets up a "RUSH RUSH" situation and leaves many chances for missing FOD hazards. Return to the hangar for engine removal is often the result, with manhours and funds needlessly wasted.

"Tools just kill me."

In the previous listing of ingested items (Feb 1959 APPROACH), there were six inlet duct covers reported ingested. It is noted that during the subsequent seven-month period there was only one reported duct cover ingestion, indicating an improvement in preflight supervisory and inspection procedures by pilots and plane crews. However, the assorted nuts, bolts, hand tools, tie-downs and other equipment found in damaged engines leaves a large area for house cleaning improvement by maintenance personnel.

Use of vacuum cleaners in the inlet ducts, cav-

ities, and plenum chambers will go far to improve the present deplorable situation. One squadron, after a siege of damaged engines due to foreign material ingestion, decided that something had to be done and grounded all aircraft. Then, using a large capacity vacuum cleaner, the fuselages were thoroughly cleaned with particular attention given to the sharp corners made by rib structures and formers. After this, whenever an engine was removed, the process was repeated. In the following six-month period that squadron had only one engine change due to foreign object damage, and this was solely a pilot factor.

It is noteworthy that the DIRs, over this seven-month period, involved all types of engines and aircraft from widely separated localities, indicating that FOD is not restricted to one operating area.

FOD can, and *will*, happen to your engines unless strictly enforced clean-up, supervisory and inspection procedures and programs are *established* and *maintained*. It is strongly recommended that all supervisory, inspection and maintenance personnel read and become familiar with the contents of the information pamphlet "Aircraft Gas Turbine Foreign Object Damage Protection," published by the Naval Aviation Safety Center. It is further recommended that all maintenance personnel review the following list of *identified* items, compare it with the listing in the February issue of APPROACH, and take necessary action to reduce this needless waste of funds, aircraft readiness, material and manhours.

Case Number	Item	Report	Engine/ Aircraft	Engine Time Since New Or Overhaul
1	Gas cap chain	DIR	J33/TV2	134.0
2	Rivets	DIR	J33/TV2	222.0
3	10/32 nut and bolt	DIR	J33/P4M	81.0
4	Paper and gasket material	DIR	J34/F2H	419.0
5	Two pieces ⅜" metal—paper gasket material	DIR	J34/F3D	105.0
6	Machinist's scribe	DIR	J34/F3D	75.0
7	Diffuser screws	DIR	J34/P2V	64.0
8	⅜" nut	DIR	J34/F2H	130.0
9	Cloth with buttons	DIR	J34/F2H	100.0
10	Wood splinters	DIR	J34/F2H	191.0
11	Rubber strips 1" wide	DIR	J34/F2H	130.0
12	Ten pieces 5/16" x ¾" aluminum	DIR	J34/P2V	14.0
13	Generator cover bolt washers	DIR	J34/F3D	1.0
14	Wood stock ⅞" x 4½"	DIR	J48/F9F	357.0
15	Screw and nut	DIR	J48/F9F	2.0
16	Metal—steel and brass	DIR	J57/A3D	214.0
17	¼" washer—steel	DIR	J57/F8U	298.0
18	Red string and rubber	DIR	J57/A3D	113.0
19	Live ammunition	DIR	J57/F8U	248.0
20	Steel container of oil	DIR	J57/F8U	174.0
21	Flange bolt (P/N 236417)	DIR	J57/F4D	136.0
22	Fibre material	DIR	J57/F8U	25.0
23	Aluminum metal piece	DIR	J57/F8U	25.0
24	Aluminum metal piece	DIR	J57/F8U	234.0
25	Tie-down hook—3' of cable	DIR	J57/F8U	155.0
26	Landing down-lock pin flag	DIR	J57/F4D	215.0
27	Rag	DIR	J57/F4D	89.0
28	½" socket wrench	DIR	J57/F8U	152.0
29	Wash rag	DIR	J57/F8U	117.0
30	Run-up screen lock pin	DIR	J57/F8U	73.0
31	Cloth	DIR	J57/F8U	88.0
32	Metal 1/16" x 5/16"	DIR	J57/F8U	160.0
33	Rivet (P/N 317376)	DIR	J57/F8U	32.0
34	Rawhide leather	DIR	J57/A3D	376.0
35	Bolt and rag	DIR	J57/F8U	382.0
36	Generator pieces	DIR	J65/FJ3	81.0
37	Canopy lock flag and pin	DIR	J65/A4D	116.0
38	Wiping towel	DIR	J65/FJ3M	60.0
39	Duct cover	FLIGA	J65/FJ4	Unknown
40	Cloth	DIR	J65/FJ3M	38.0
41	Pair of pliers	DIR	J65/FJ3M	3.0
42	Washer	DIR	J65/FJ3	36.0
43	Generator brushes	MSG	J65/FJ4B	158.0
44	Seat safety pins	FLIGA	J69/TT1	Unknown
45	Headset head band	DIR	J71/F3H	88.0
46	Nylon tie down	DIR	J71/F3H	80.0
47	7/16" x ⅜" drive socket	DIR	J71/F3H	119.0
48	Access jury strut (P/N 25-32015-2)	DIR	J71/F3H	122.0
49	¼" nut and bolt	DIR	J71/F3H	5.0
50	10/32 Phillips screwdriver	DIR	J71/F3H	61.0
51	Ear protectors—sponge rubber	DIR	J71/F3H	60.0
52	Pilot's knee board	DIR	J71/F3H	263.0
53	⅜" drive—6" extension	DIR	J71/F3H	29.0
54	Flashlight	DIR	J71/F3H	104.0
55	Flashlight	DIR	J71/F3H	70.0
56	Airframe ducting	DIR	J71/F3H	121.0
57	¼-28 bolt ⅞" long with nut	DIR	J71/F3H	42.0
58	¼-28 screws—ducting	DIR	J71/F3H	146.0
59	Nylon tie down assembly	FLIGA	J71/F3H	17.0

The estimated overhaul cost of these engines is as follows:

Engine Model	Number	Overhaul Cost Per Engine	Total Cost
J33	3	$4500.00	$13,500.00
J34	10	$4000.00	$40,000.00
J48	2	$6500.00	$13,000.00
J57	20	$8000.00	$160,000.00
J65	8	$7000.00	$56,000.00
J69	1	UNKNOWN	UNKNOWN
J71	15	$9000.00	$135,000.00
TOTALS	59		$417,500.00

FILTER TIPS

FUEL icing is a problem. Fuel icing is a problem? Is fuel icing a problem? Is fuel icing much of a problem? How much of a problem is fuel icing?

During the calendar years 1957 and 1958 there were 12 aircraft accidents, incidents and forced landings reported which were attributed to icing of the fuel system. For that period, only first line, operational prop and jet aircraft were considered. But that seemingly low figure does not tell the whole story.

Icing of the fuel system may frequently go undetected.

In fiscal year 1958, 33 out of 149 jet engine flameouts which were reported as accidents or forced landings were finally listed as "undetermined." Some of these occurrences may have resulted from fuel icing. There are many engine and fuel system malfunctions which fortunately do not end in injury or damage or are otherwise not reported. Any number of these may arise from icing of the fuel system. When an engine quits because of clogging of a filter with dirt or sand or other particles, the filter may be pulled and examined and there is the dirt or sand or other particles. But when ice melts off of a filter, it is just water again and can no longer be found!

Whether it is dirt or ice or sand which clogs the filter, the results are the same. Out of 25 fuel icing and contamination cases reported in 1957 and 1958, 15 involved sudden loss of power or complete flameout. In 9 out of the 25 cases, the engine flamed out or quit abruptly without any other indications. In 7 cases, the engine went into an overspeed condition. Sudden loss of power was the first indication in 6 of the cases.

Don't be misled by the tendency to save any discussion on fuel icing for the winter season. The cases examined showed that *neither the time of year nor the geographical location had any effect on the frequency of fuel icing.* All it takes is water in the fuel in some form and flight above the freezing level.

The shift to increasing numbers of jet aircraft has increased the need for attention to the fuel icing phenomenon. JP-5 has a remarkably large capacity for holding water. Fuel systems have become more complex with the addition of fuel controls and extremely fine micronic filters. Because the jet requires about 6 or 7 times as much fuel

as the recip the fuel system must be able to handle about 6 or 7 times as much contamination. or ice.

The schematic is presented to show those components of the fuel system where icing is most likely to occur. Referring again to the 25 cases discussed here, icing or contamination accumulated at the low pressure fuel filter 7 times, at the fuel pump servo hose 6 times, at the fuel control 5 times, at the fuel cell strainer and quantity probe twice each and at the high pressure fuel filter and nozzle filter once each. In one case, contamination blocked an external fuel tank.

Flight above the freezing level would be rather difficult to eliminate. So we can only go to work on the other item which leads to ice in the fuel system: water in the fuel. This can be present in three forms: free water, suspended or entrained water and dissolved water. The presence of *free water* may be discovered and purged out or separated with some success by the diligent use of existing equipment.

Entrained water is not usually visible to the naked eye and will cause milkiness of the fuel only in extreme cases. Water in this form will eventually settle out again and may then be separated from the system as free water. If the entrained water is present in the system at takeoff, however, a race begins to find out whether the water will be removed from the tanks by the evolvement of air as the temperature and pressure decrease or freeze into ice crystals and commence fouling of the filters.

Dissolved water is held in solution by the fuel in a percentage which varies with temperature and pressure. This situation is similar to the concept of humidity of the atmosphere and may be thought of as "humid fuel." Dissolved water does not settle out and may be removed only by absorption or refrigeration. Humid fuel does not seem to be a significant factor except in high performance aircraft with their high fuel consumption rates and subjection of fuel to large and rapid changes in temperature.

Just how much of a problem fuel icing is still remains a little indefinite. But anything which causes accidents and flameouts and forced landings, even in limited numbers, is certainly a problem and must be recognized and solved.

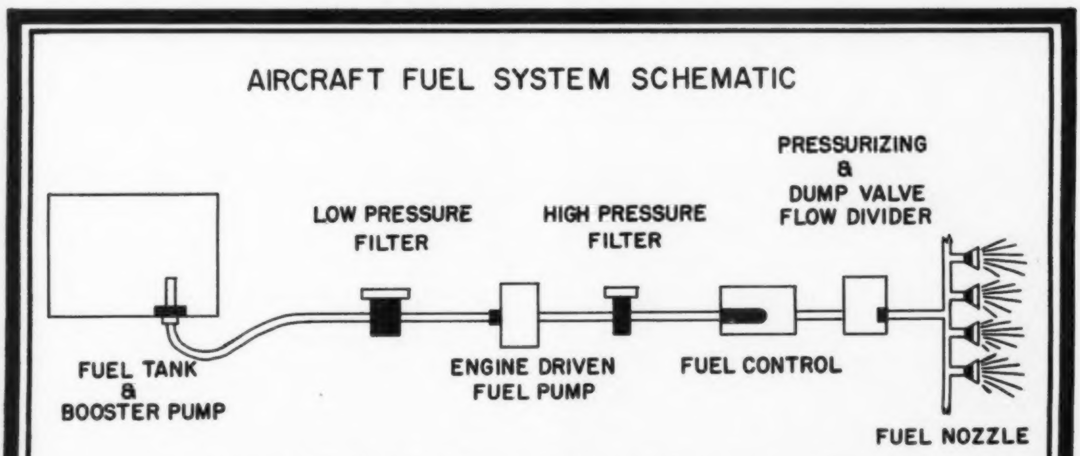
Fuel icing in all of its forms cannot yet be entirely eliminated. Advancements continue to be made in improving fuels, fuel systems and fuel handling equipment. It remains the responsibility of the line maintenance and fueling people to take the necessary precautions to minimize the frequency and severity of fuel system icing.

► Insure that fuel delivered to the aircraft contains no free water.

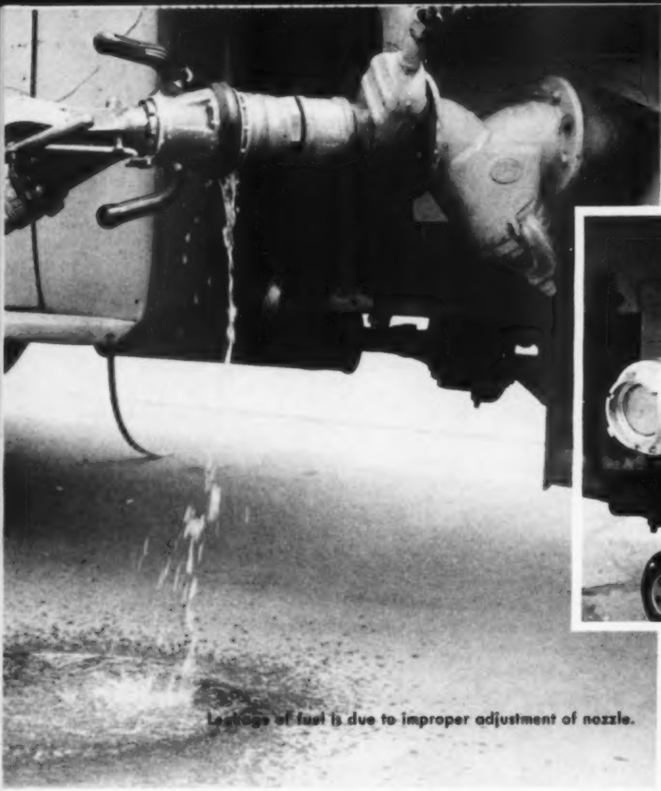
► Keep the aircraft full of fuel at all times insofar as possible while on the ground.

► Drain sufficient fuel from low points to ensure absence of free water just prior to flight as well as before and after fueling.

► And pilots, occasionally during flight, slowly move the throttle from cruise to military and back again. If this operation results in fluctuating fuel flow or sticking RPM, you may have a fuel icing problem and should treat it as an emergency.

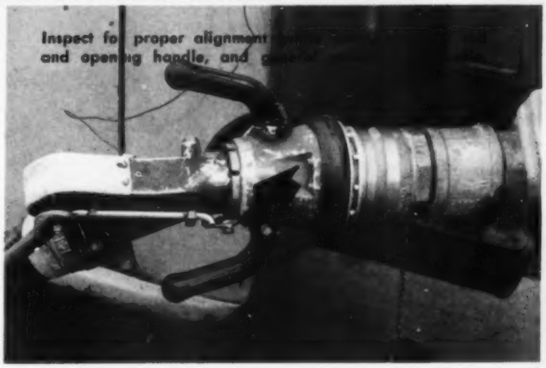


Ice most frequently accumulates at the low pressure filter (see illustrations, opposite page).



Leakage of fuel is due to improper adjustment of nozzle.

[illegible] part no. 4096D.



Inspect fo[illegible] proper alignment [illegible] and open[illegible]g handle, and [illegible]

FUEL NOZZLE INSPECTION TECHNIQUE

The swept-winged A4D taxied from its touchdown to the refueling truck parked close by. The pilot and ground support personnel probably were thinking of that morning as just another bright day on the runway—but it was the last day for this navy jet. Minutes later, although pilot and refueling crew escaped unharmed, the plane was black smoke and fire.

Leaking fuel from the pressure refueling nozzle combined with the heat generating from the recent engine shutdown resulted in a category A-1 strike for a firstline aircraft. This was not the only such accident resulting from malfunctioning of the Parker P-1 refueling nozzle (see ComNavAirLant 171548Z of Dec 1958 and BAMR Eastern District 291932Z of May 1959). BAMR had emphasized in its letter BA-4/5/10200/5-1/2995 of 17 June 1959 the need for improvement in inspection procedures.

Taking cognizance of the serious danger involved, and to insure that accidents of this type did not occur at NAS Oceana, an intensive "brain storming" session was initiated. It was realized that one element in the check-off list was missing. The Navy had no setup for testing the fuel nozzle for leaks by actually passing fuel through it prior to refueling a hot aircraft. We needed a "wet run" device to test the Parker P-1 pressure refueling nozzles on which misalignment or malfunctioning of the sequence rod locking device would permit the fuel to flow with a resulting high pressure leak.

And now the Navy has the answer; it is the "Buckeye" tank truck hydrant adapter, part number 4096D, a simple but highly effective device, shown in the second photograph. The adapter, as can be seen, fits on the fuel inlet line of the fuel truck so that when the truck itself is filled, the adapter, which is identical to the fuel inlet line on the aircraft, gives an accurate picture of the leakproof or leaky setup of the pressure refueling nozzle under actual operating conditions. The procedure has been incorporated into regular inspection procedures at NAS Oceana and has proved highly successful.

—Contributed by
CDR E. G. Dalbey, SC, USN

MURPHY'S

LAW*

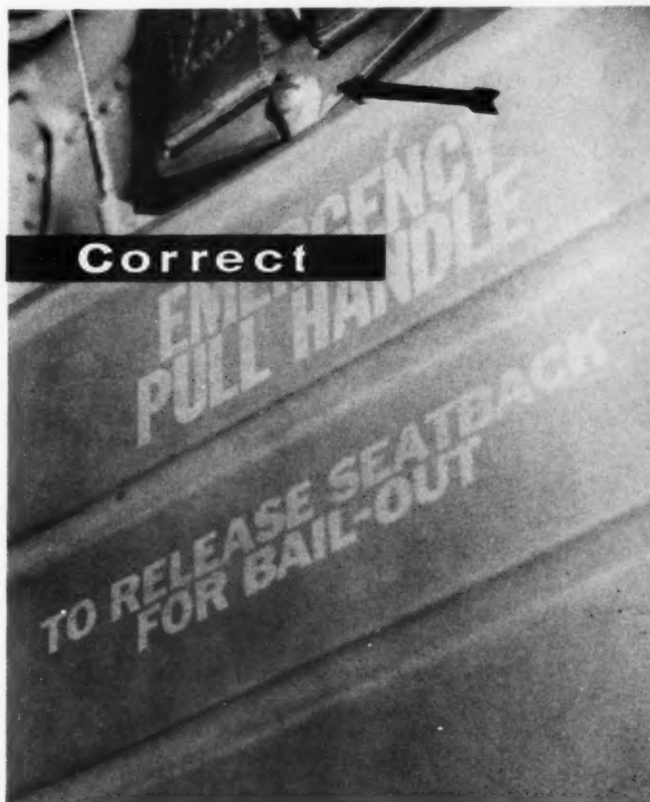
Incorrect Method of Installing Shoulder Harness to Radar Operator's Seat in S2F Aircraft

Investigation of complaints by S2F radar operators that their shoulder harness would not return after being pulled out from the locked position, revealed the following:

In five aircraft, the bolt, left photo, was reversed so the nut faced aft. Consequently when the crewman unlocked the harness inertia reel and leaned forward, the bolt was drawn out from behind the seat. When tension was released, the nut hung up on the panel on the rear of the seat and the inertia reel would not retract the harness. This constitutes an dangerous situation in carrier operational aircraft.

The correct position of the bolt is illustrated in right photo.—*Contributed by CO, VS-21.*

Incorrect



Correct

* If an aircraft part can be installed incorrectly, someone will install it that way!

clipboard

Plane Sense Want to stop practices which threaten safer operations? Report to your superior, or submit an Anymouse Report to NASC.

Icing

IN general, icing in thunderstorm clouds has not proved to be a serious problem because of the relatively short time spent in traversing this type of activity. About 400 of the U. S. Thunderstorm Project traverses were made at temperatures below freezing. Clear ice was encountered on only five of these penetrations, and accumulation in all cases was less than 1/16-inch. Wet snow packing on wing leading edges was experienced during 340 traverses, but maximum accumulation was ¼-inch. During 500 miles of flight within cumulonimbus in the United Kingdom, difficulty was experienced only twice. The first occurred during the early stages of the experiment and flight was abandoned (details are not available). On the other occasion, very heavy airframe icing was experienced during a flight of about 25 miles along a line of thunderstorms.

On the other hand, carburetor icing was fairly frequent, occurring most often at temperatures between +18° C. and —10° C. Use carburetor heat as recommended in the operating manuals. —*TWA "Flite Facts"*

Flight Planning Rooms

THIS safety officer reports that, at most of the bases he visits, NOTAMs are not decoded, nor is there an up-to-date NOTAM file. At his base, he reports that his eagle-eyed base operations officer caught some of the local jocks filing out without checking the Airman's Guide for en route NOTAMs. He decided it was easier to modify his flight planning room than to educate and/or inconvenience the pilots. A map of the U. S. is now framed under plexiglass and hung on the wall. It is made up of the current high - altitude facility charts. Airman's Guide information and daily VOR NOTAMs are posted on the chart in grease pencil. Low-altitude fixes not published on the chart are also posted (by approximation). The VOR compass roses are circled in black, red or purple. The code is as follows:

Black indicates "See Airman's Guide or VOR NOTAM file" (used when VOR is operational but still contains some hazard); red means "VOR out," and the chart does not indicate "Out UFN"; purple means "Recommissioned" or "Converted," and the chart still indicates "Out UFN."

Approximately four man-hours are used to re-do the chart each time a new issue of the Airman's Guide is received. About 15 minutes is required daily to review and post the NOTAMs.—*USAF "Interceptor" (ADC)*

Answers to Quiz, page 23

1. That the area is used for limited times. See the FPD for the times of use.
2. In the Flight Planning Document, Sec. II.
3. In the Enroute Supplement. If you need it in the air, just call; if you want to practice, you should have time to look it up.
4. None. The designers of the charts feel that it is safer and not much further to go by airways. Nothing prohibits you from using a WAC chart and going direct if you so desire.
5. No, only major ones. Space prohibits showing all of them.

PreFlight Means *Pre*-Flight

THAT's right—our preflight inspections must be conducted prior to becoming airborne. (Otherwise this obviously makes the walk-around portion rather difficult!) Yet—how many of us rush this vital part of flight? And why?

—The briefing took longer than planned.

—The pilot was late in arriving for the hop. (Particularly applies to "proficiency pilots")

—One last cup of coffee.

—The aircraft had been placed in an up status *while final minor work was still going on.*

—An interesting bull session in the line shack.

—The refuelers were late in arriving.

—Takeoff time moved up unexpectedly.

—One last required "head run."

—Last minute change in briefing due to weather or alternation of mission *without* change in takeoff time.

—Sudden or unexpected missions. You can't help in any emergency if you are spread all over the rice paddys.

Add them all together they spell poor planning and budgeting of time. Also, they spell accidents.

Remember—you are bucking for an accident if you just *kick the tire and light the fire!—1st MAW "Wing Tips."*

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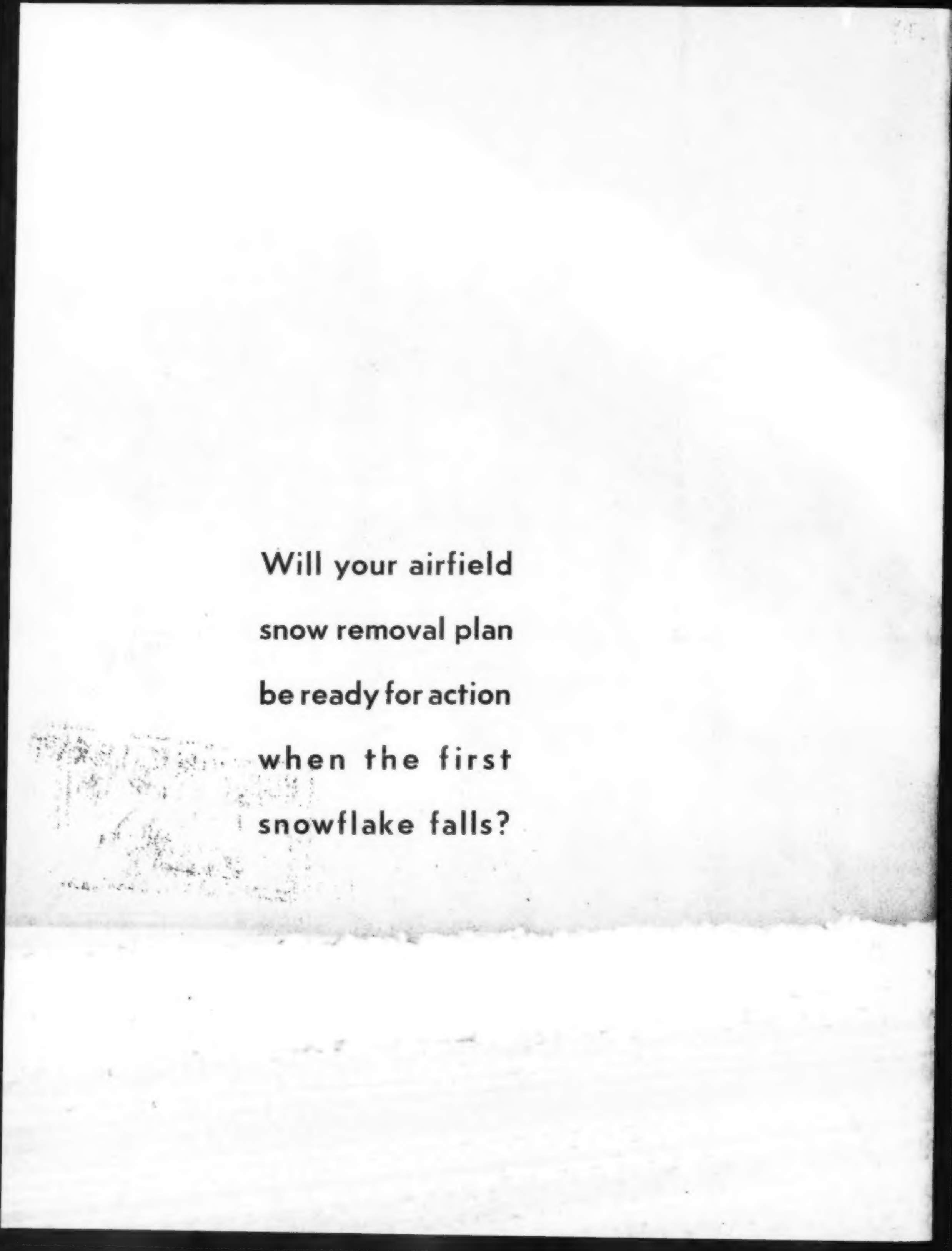
The symbol of the large, well-fatted turkey is beginning to appear. The kids will soon be cutting out pictures of Pilgrims and Indians and rehearsing for the school play.

Each individual has his own thoughts as Thanksgiving Day again preludes the coming of a holiday season. Many of the single men will be anticipating a little leave and a trip home to celebrate with the family. Some of those with wife and five dependent children will be counting the pocket change and wishing they had opened a Christmas savings account. The aviators, with a tendency to take on more pounds than the flight surgeon will tolerate, have trimmed down to fighting weight to prepare for the expected struggle wih poultry, potatoes, plum pudding, pumpkin pie and punch.

But for the moment, everyone on the aviation team will be giving thanks for his own blessings. They will be expressing gratitude for the continued reduction in aircraft accidents. They are resolving that there will be no letdown in the safety effort before, during, or after the holidays.

To all, Happy Thanksgiving. Eat hearty. Have a real ball. Then slide back into harness and get cinched up for the last half of fiscal 60.


Will your airfield
snow removal plan
be ready for action
when the first
snowflake falls?